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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL, DS, GS, AND DEPOT MAINTENANCE MANUAL

PUBLIC ADDRESS SET AN/UIH-5

HEADQUARTERS, DEPARTMENT OF THE ARMY

NOVEMBER 1964

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Warning Notice

This equipment employs semi-conductor devices. Permanent damage to these components will result from improper use and faulty maintenance.

DO throw power switch to off whenever protective circuit stops operation.

DO use reduced battery voltage (12 volts or less) when checking and testing a faulty amplifier.

DO NOT solder or unsolder transistor connections without properly applying a "heat-sink".

DO NOT apply primary electric power to the system in reverse polarity.

DO NOT disconnect the power supply or load while the system is in operation or the power switch turned on.

DO NOT operate using a high impedance or an unfiltered dc power supply.

DO NOT overload amplifier by connecting additional speakers. (The minimum allowable load impedance is 1.75 ohms).

DO NOT apply external battery or charging voltage with the POSITIVE terminal grounded. (The AN/UIH-5 ( ) frame is grounded to the NEGATIVE terminal.)

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 20 November 1964

Organizational, DS, GS, and Depot Maintenance Manual
PUBLIC ADDRESS SET AN/UIH-5

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* This manual supersedes TB 11-5830-240-12/1, 30 December 1963.

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SECTION A

INTRODUCTION

A-1. Scope

This manual describes Public Address Set AN/UIH-5 (fig. 1) and provides instructions for installation and operation, and operator, organizational, direct and general support, and depot maintenance. It includes instructions for cleaning and inspection of the equipment and for troubleshooting, testing, and repairing this equipment.

A-2. Index of Equipment Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. Department of the Army Pamphlet No. 310-4 is an index of current technical manuals, technical bulletins, supply manuals, supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc) and the latest changes to and revisions of each equipment publication.

A-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting by the individual user, of errors, omissions, and recommendations for improving this equipment is authorized and encouraged. DA Form 2028 will be used for reporting these improvements. This form may be completed by the use of pencil, pen, or typewriter. DA Form 2028 will be completed in triplicate and forwarded by the individual using the manual. The original and one copy will be forwarded direct to: Commanding Officer, U. S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, New Jersey 07703. One information copy will be furnished to the individual's immediate supervisor (officer, noncommisioned officer, supervisor, etc).

SECTION 1
GENERAL INFORMATION

1-1. Scope of Manual. This Technical Manual contains information pertaining to the functions, installation, operation and maintenance of the Public Address Set AN/UIH-5 ( ). The manual should be studied by all personnel required to install, operate, or maintain the equipment.

1-2. General Description.

Public Address Set AN/UIH-5 ( ) is a rugged, compact, flexible, and highly mobile voice amplifying system designed to meet a wide range of operational requirements in such applications as air-sea rescue operations, tactical control of dispersed ground troops, traffic control, voice communications with remote population areas (friendly or enemy), disaster communications, and the like.

In brief, the system consists of a high-powered transistorized audio amplifier, together with the required microphone, loudspeaker assemblies, control units, and necessary interconnecting cables and test accessories. Figure (1) illustrates a complete Public Address Set AN/UIH-5 ( ).

1-3. Description of Units.

In order to provide a clear understanding of the Public Address Set AN/UIH-5 ( ), each of the major units comprising the Set are described in the following paragraphs.

1-3.1. Amplifier AEM-DE-1492C.

Amplifier DE-1492C, illustrated in Figure (2), is the basic unit of Public Address Set AN/UIH-5 ( ). This amplifier is a completely transistorized 250 watt audio power amplifier. Electrically, its function is to accept the selected audio input signal (microphone, recorder, or telephone line), and to develop the high audio powers required to drive the system loudspeaker coils. Special circuits are incorporated in the amplifier to provide protection from accidental polarity reversal of the primary power connections, from excess current drain, from excessive applied voltages, and from unsafe maximum operating temperatures.

Physically, Amplifier DE-1492C is housed in a rugged, extruded aluminum chassis of black anodized finish designed for maximum protection of circuit elements and efficient heat dissipation.

1-3.1. (Cont.) Provisions are made for easy access to internal components and test points for maintenance and adjustment.

1-3.1.1. General Specifications, AEM-DE-1492C.

The following tabulation lists the significant electrical specifications of Amplifier DE-1492C.

Supply Voltage	Nominal, 28 Volts, D.C. (24-32 Volts, D.C., maximum), with NEGATIVE ground.
Power Supply Internal Impedance	Maximum, 0.10 ohms from 0-5000 cycles per second.
Rated Power Output	250 Watts into a resistive load of 1.75 ohms, with standard input.
Input Signal Levels	For rated power output, the following input signal levels are required: Microphone Input — 0.010 Volts rms, 1000 cps. Recorder-Line Input — Low impedance, 0.100 Volts rms, 1000 cps High impedance, 0.300 Volts rms, 1000 cps.
Input Impedance	Microphone — 50 ohms (Pins A - C). Recorder-Line — Low Z, 600 ohms balanced, (Pins B - C). High Z, 2000 ohms (Pins A - C).
Output Impedance	Resistive, 1.75 ohms. Nominal loudspeaker, 2 ohms.
Frequency Response	± 3 DB from 500 to 5000 cps with 0.010 Volts at "Microphone" receptacle.
Harmonic Distortion	Less than 12% at 0.4 rated power output into standard resistive load of 1.75 ohms with sine wave input of 1000 cps.
Temperature	-30° F to +140° F. (-35° C to +60° C).
Altitude	Maximum, 12000 feet above sea level.

1-3.2. Amplifier Rack AEM-RAC-12.

The Rack (Figure (5)) serves to mount or stow all system units except the AEM-H-92S-4 Speaker Unit, its cables and mounting brackets. The rack consists of the frame, cable reel, and Junction Box AEM-JB-1C.

1-3.2.1. Frame.

The main frame of the RAC-12 is built of two matching rectangular enclosures. These are hinged together with removable pins to permit the rack to be secured as a single package, opened up and erected on a flat surface, or completely separated to make two independent packs. Constructed of welded aluminum tubing and channel, the frame provides maximum protection to the system units while in use or in transit.

In one section of the rack are mounted the DE-1492C Amplifier, the CON-1M Remote Control with MIC-1 Dynamic Microphone, and when used, the Portable Battery.- This section of the rack has a shield at the top, rear, and sides to protect the amplifier from direct sunlight and rain. Attached to the bottom is a compact rack stand which folds out of the way when not in use.

The opposite section of the rack provides storage space for the cable reel, the TP-3 Speaker Tripod and the FT-1 Test Set. The FT-1 Test Set is stored in a rectangular aluminum box riveted to the frame and covered by the cable reel. The tripod is held by a spring clip along the hinged edge.

1-3.2.2. Cable Reel.

The cable reel provides storage for three cables. The 100-foot remote cable CBL-R-100A stores separately on one side of the reel. The reverse side provides storage space for (1) CBL-1-15, the 15-foot power cable and (2) CBL-BC-10, the 10-foot battery charging cable.

1-3.3. Junction Box AEM-JB-1C.

The junction box provides the means of interconnecting the various system units. Mounted just below the DE-1492C Amplifier in the rack, it may be removed for use without the rack. Its front cover is easily removed for access to the terminals and components inside.

Interconnected within the junction box are the leads from three receptacles and two mating plugs to the DE-1492C Amplifier. A

1-3.3. (Cont.) power receptacle mates to either of two power cables, CBL-1H for use with the portable battery when mounted in the rack, or CBL-1-15, the 15-foot power cable which connects to a vehicular or alternate power source. A charging cable receptacle mates with CBL-BC-10 for use in charging the portable battery while mounted in the rack. The remote cable (CBL-R-20A or CBL-R-100A) connects to the remote cable receptacle for operation from the CON-1M Remote Control Unit.

1-3.4. Remote Control Unit AEM-CON-1M.

The Remote Control Unit CON-1M, shown in Figure (3), provides the necessary operating controls and monitoring indicators in a light, hand-held case for use within a radius of 100 feet of the amplifier rack. The remote unit provides receptacles for Microphone AEM-MIC-1 and external signal sources, such as a tape player or 600-ohm audio line. The remote unit also includes a signal output jack which, by means of paralleling cable AEM-CBL-AD5, can supply an input signal to a second remote unit (thus permitting several public address sets to be operated from a single audio signal through their individual remote units).

1-3.5. Microphone AEM-MIC-1.

Microphone MIC-1 is a hand-held dynamic noise-cancelling type with connector for coupling directly into Amplifier DE-1492C or into the CON-1M Remote Control Unit.

1-3.6. Loudspeaker AEM-H-92S-4.

Loudspeaker H-92S-4, shown in Figure (4), is a light-weight, compact transducer unit easily erected on ground or carrier, utilizing tripod or mounting brackets. Connecting cables supplied with the AN/UIH/5 ( ) allow the speaker to be located up to 120 feet from the amplifier rack.

1-3.7. Amplifier Test Set AEM-FT-1.

Test Set FT-1 is intended for operational checks of the system, for "silent" dry runs, and for trouble shooting. The set is shown in Figure (6). It consists of Test Meter TE-1421 and resistive dummy load TE-1422. Their use is discussed more fully in Sections 3 and 4 of this manual.

1-3.8. Protective Circuit Test Unit AEM-TE-1424.

This is special equipment for testing and adjusting the protective circuit of the DE-1492C Amplifier, and is shown in Figure (7). It is normally supplied for depot use only.

1-3.9. Cables.

All cables for the system are listed in Figure (36). This table gives type, designation, description, length, and place of storage. Cabling diagrams for the system, Figures (8) through (16), indicate the cables to be used in each of the various system configurations.

1-3.10. Portable Battery.

Public Address Set AN/UIH/5 ( ) is designed to mount a rechargeable battery for operation independent of any vehicular or other power source for periods of 1 1/2 to 2 hours (longer if used intermittently).

The battery supplied is a light weight nickel cadmium type. It consists of 20 cells and supplies a nominal output voltage of 28 volts when fully charged.

SECTION 2

INSTALLATION

2-1. General Installation Requirements.

The AN/UIH-5 ( ) Public Address Set is adaptable to a wide range of installation situations, such as portable ground installations, vehicular installations, or airborne installations, either fixed or rotary wing types. This section discusses the general conditions, precautions, and detailed requirements for typical installations in all these categories.

2-2. Ground Installations.

Typical ground installations of the AN/UIH-5 ( ) will normally require use of the units shown in Figure (8). It can be seen that the center of the system installation is the Amplifier Rack RAC-12. The Speaker Unit H-92S-4 can be located at any convenient point up to 120 feet from the central rack, and the Remote Control Unit CON-1M can be located up to 100 feet from the rack.

Within these limitations, installation should be planned to provide the greatest possible efficiency from the system. Most important to efficient performance is the choice of an optimum site for speaker location.

2-2.1. Speaker Site Selection.

Sound waves are transmitted by, and through the air, and are strongly influenced by wind, weather, time of day, and interfering objects. Satisfactory sound projection over great distances is possible only from well chosen sites which take maximum advantage of natural elements. Optimum location of the speaker unit is the prime factor in site selection. This is especially important when maximum range is desired. Location within line of sight to the target is desirable; for example, a hillside location with the speaker directed down or across a valley would be ideal. Sound carries well across water. Consequently, advantage can be taken of a river or a lake to improve sound transmission. When possible, locate upwind of the target to use the carrying power of the wind. The site should be clear of foliage or other obstructions in front of the speaker for at least several hundred yards. Intervening masses, such as buildings or hills will obstruct the transmission of sound. A cross-wind will deflect the line of transmission in a downwi...

2-2.1. (Cont.) direction (the approximate correction for this effect is 25 yards for each mile of transmission per each 10 MPH of crosswind).

2-2.2. System Assembly.

Assembly of the AN/UIH-5 ( ) Public Address Set is facilitated by the use of the wiring diagram shown in Figure (8). If the system is to be used with external power, reference should also be made to the cabling diagram of Figure (9). Assembly of the public address set for ground site operation is explained in the following paragraphs.

2-2.2.1. Erect the Amplifier Rack.

Unlatch and open the amplifier rack. Support in an upright position by leaving the two sections of the rack at right angles to each other or by extending the feet on the rack. CAUTION: Operation of Amplifier DE-1492C in an upright position will facilitate the dissipation of the heat generated in the amplifier.

Remove Tripod TP-3 and the cable reel from the open rack frame.

2-2.2.2. Set up Speaker Unit.

Speaker Unit H-92S-4 will normally be mounted on Tripod TP-3 in a ground installation. Erect the tripod by adjusting the length of the legs as needed to make it stand erect on solid footing. Raise the mounting shaft in the tripod center post bearing a few inches and tighten upper thumbscrew. Drop the speaker onto the shaft and secure with latch pin. The speaker unit can then be rotated as desired and locked in place by the knurled screws. The speaker unit can be adjusted to proper elevation angle and clamped in position by the hand nuts provided at the side of the speaker unit U-frame. When the speaker unit assembly is in danger of toppling due to heavy winds or uncertain footing, additional support may be afforded by the use of guy wires secured to the tripod or frame. The speaker cable, stored around the speaker unit, should be paid out along a path between the amplifier rack and speaker and secured so as to be safe from foot or vehicle traffic. NOTE: Speaker cables cannot be interchanged end for end.

2-2.2.3. Establish Operating Point.

The Remote Control Unit CON-1M will be located at the operating point. It is important that the microphone be sufficiently removed from the speaker unit to avoid acoustical feedback. An intervening distance of 50-75 feet to the rear will be enough in most

2-2.2.3. (Cont.) cases. Good isolation of the microphone can be obtained by an enclosure or an intervening object. When absolutely necessary, gain can be reduced.

Connect the Microphone MIC-1 to the remote control unit through MIC input receptacle for the transmission of voice. Connections to the RECORD-LINE receptacle from an external source should be made according to the wiring diagram of Figure (10). Remote Control Cable CBL-R-100A should be paid out from the reel along a safe path leading from the amplifier rack to the remote control location.

2-2.2.4. Connect Cables and Power Source.

When the portable battery is mounted in the amplifier rack, power cable CBL-1H is used as shown in Figure (8). In making the proper connection to the battery it is to be noted that the white lead goes to the positive terminal and the black lead to the negative terminal. Connected also to the power cable CBL-1H is the speaker cable CBL-20A or CBL-100A. Either may be used alone or connected end to end as needed.

When a rack mounted battery is not used CBL-1-15 will be substituted for the power cable CBL-1H. The same rule (white to positive and black to negative) applies as shown in Figure (9). NOTE: Supply should have NEGATIVE ground, if any. Remote control cables CBL-R-100A or CBL-R-20A connect to the junction box at the amplifier rack.

The set is now ready to operate. Prior to sound transmission it is necessary to check the set operation. Procedures for making such checks are discussed in Section 4 of this manual.

2-2.3. Multiple System Installation.

Most of the procedures which apply to single system installations also apply to multiple system installations. Certain additional considerations are important in the case of the more complex installation. For example, the selection of a speaker site is influenced by the nature of the objective. Dissemination of sound over a large area will be better achieved by the use of horns dispersed from each other. But, transmission to a point target at a considerable distance would be better achieved by using several speaker units at the best site obtainable, since a power multiplying effect is obtained by multiple speakers arranged in a flat array producing an "in phase" sound wave front.

Practical considerations will dictate the locations of the various other system units.

2-2.3. (Cont.) The systems must be interconnected through their remote control units, this interconnection being made by paralleling cable CBL-AD-5. This cable is 5 feet long and thereby limits the dispersion of the control units. The interconnection of the remote control units is made as shown in the cabling diagram of Figure (11).

Another method of driving multiple systems from a single audio source when that source is a telephone line is worthwhile tc note. Many systems may be interconnected by a telephone transmission system to give coverage over a large area to a single event. In this case, each AN/UIH-5 ( ) Public Address Set would be operating as an independent system.

2-3. Vehicular Installation.

Two methods of vehicular installation may be commonly employed. These are the completely mobile operation or alternately, operation with removable speaker units and flexible remote control provisions. Both situations are discussed below.

2-3.1. Temporary Fixed Site.

The AN/UIH-5 ( ) Set can easily be transported in a mobile carrier and used at different site locations. In general, the same considerations as for a ground site installation will prevail, the vehicle acting as a transport unit, the speakers being established at some suitable point on the terrain, and the point of operation being either in the carrier or at some alternate point within permissible radius of the cable.

When operated from a vehicle with the portable battery mounted in the rack, it may be desirable to provide a charging circuit for the battery from the vehicular charging generator, providing of course, that the charging generator is of the correct voltage. By this means, the portable battery will be kept in a charged condition at all times. The proper cabling for charging the battery is shown in Figure (12).

2-3.2. Mobile Use.

The completely mobile installation of the AN/UIH/5 ( ) system makes it possible for transmissions to be effected enroute as well as parked. Therefore, all units of the system must be mounted to the same vehicle. The speaker unit may be either fixed or rotatably mounted. The mounting brackets, AEM-MB-1 and AEM-MB-2, are shown in Figure (4). Best speaker mounting would be on either front or rear bumper using MB-1 since the sound beam could then be directed by the vehicle driver over a wide ar.gle, and maximum

2-3.2. (Cont.) acoustical shielding of the microphone would be obtained. Closing windows of the vehicle will also provide better isolation of microphone and speaker.

When choosing an operating position for the Amplifier Rack RAC-12, it should be kept in mind that maximum cooling of this unit is necessary. The rack should be erected in circulating air but out of direct sunlight. It should be mounted vertically to allow maximum circulation of cooling air through the amplifier cooling vents. If these conditions cannot be met in very hot climates, it would be desirable to limit system operation to short periods of time with appropriate cooling intervals interspersed.

In a vehicle such as a jeep or troop carrier, the choice of a power supply may be made between the 28 volt supply of the vehicle itself and the portable battery in the amplifier rack. If the rack battery is available its use is generally preferred. It can be kept charged by connecting a power charging cable from the amplifier rack to the vehicle's DC system as shown in Figure (12). NOTE: All units of the AN/UIH-5 ( ) system employ a NEGATIVE ground.

Keeping the portable battery charged will allow the system to operate at times when the vehicle is shut down or when it is necessary to move into a location removed from the vehicle.

In the absence of a portable battery it is possible to use the power from the vehicle's battery directly through cable CBL-1-15. This will preclude complete freedom of movement, but some flexibility is still retained.

2-4. Airborne Installations

The configurations of the airborne AN/UIH-5 ( ) system will depend on several factors. A principal factor will be the permissible space and weight which the system can occupy. A second consideration will be the amount of power required for transmission, dictating whether a single system or multiple systems must be used. Another consideration will be the location of the operator with respect to the amplifier, determining whether or not the operation should be from a remote control unit or directly from the amplifier position.

The anticipated attitude of the aircraft during transmission will determine the location and orientation of the speaker installation. Generally, this varies between fixed wing and helicopter operation. The following paragraph discusses the possible system configurations which are available for aircraft use.

2-4.1. Minimum Airborne System.

The minimum airborne system is shown in Figure (13). It consists of the DE-1492C Amplifier, the Microphone MIC-1, the Speaker Unit H-92S-4, and the necessary interconnecting cables. A second sound source, in addition to the microphone, might be a tape recorder or radio receiver. In fixed wing aircraft the speaker unit is usually directed horizontally abeam, requiring the pilot to circle the target while pointing his wing tip at the desired area of coverage. Speaker mounting in a helicopter might be the same, that is, to the left or right with the down draft of the blades deflecting the sound to the ground. Other speaker locations on helicopters are possible, and some experimentation may be required to determine optimum speaker location and direction.

Location of the DE-1492C Amplifier will typically be adjacent to the operator using the microphone or operating the recorder or other device employed as a program source. Normally, the power for the system will be taken directly from the 28 volt DC supply of the aircraft by means of power cable CBL-1-15 connected to a convenient terminal box in the aircraft. It is advisable to mount the amplifier vertically to provide adequate cooling, especially when operation in high temperature extremes is anticipated.

2-4.2. Complete Airborne System.

Use of the complete system in an airborne operation may be dictated by the need to operate through the remote control unit removed some distance from the amplifier mounting position. Considerations of speaker mounting will be the same as those discussed above. The components and cabling of the complete airborne installation are shown in Figure (15). These units of the AN/UIH-5 ( ) system are those which are essential to the operation but not those which serve only to mount or store equipment. As shown in Figure (15), these essential units include the DE-1492C Amplifier, the JB-1C Junction Box, the CON-1M Remote Control Unit, the H-92S-4 Speaker Unit, the MIC-1 Microphone, and two or three interconnecting cables, the CBL-1-15 power cable, the CBL-R-20A remote cable, and the CBL-20A speaker cable (if needed).

The DE-1492C Amplifier and the JB-1C Junction Box should be mounted vertically together as shown in the diagram. Alignment of the junction box under the amplifier should be maintained so as not to impede the flow of cooling air through the vents of the amplifier. In the installation of the entire system, the amplifier and junction box would normally be mounted in an out-of-the-way place in the aircraft, within reach of aircraft power, and where sufficient cooling air is available. Normally the 20 foot remote cable will be

2-4.2. (Cont.) long enough to reach to the CON-1M Remote Control Unit. The Speaker Unit H-92S-4 may be within reach of the CBL-1-15 or, if necessary, the extension cable CBL-20 can be added. Remote Control Unit CON-1M can be mounted or not (as necessary) at the operator station. Microphone MIC-1 is cabled to the remote control unit for direct voice transmissions and alternate audio signals coupled to the RECORDER-LINE receptacle on the remote control unit. (See Figure 10.)

2-4.3. Multiple Airborne Systems.

The use of multiple airborne systems arises from the need for higher power, but may be limited by the capability of the aircraft to provide the primary power needed. As multiple system operation is possible only through remote control units, each system complement will be those of the complete airborne system as described in 2-4.2. Installation of each individual system is made in accordance with the instructions given in paragraph 2-4.2.

The several speaker units for the multiple system installation can be mounted in a single bank, or can be dispersed, dependent on the mission. A single bank of speakers with a common orientation implies a point target. Dispersed speakers, or varying orientations imply either a large target area or a choice of aircraft attitudes where any reception point will have the benefit of correspondingly lower sound power. Thus it can be seen that the individual application must dictate the speaker orientation to be used.

The amplifier-junction box combinations of the various systems can be mounted as a group in a single location of the aircraft or dispersed as practical considerations dictate. It is necessary only to observe the restrictions imposed by the cable lengths and the need for heat dissipation as discussed in 2-4.2, above. The need for adequate heat dissipation becomes especially important where several amplifiers are to be mounted in a group. Each amplifier should be allotted a volume of mounting space equal to at least 5 times its own volume, unless forced air circulation is provided. While the amplifier is capable of operating up to 12,000 foot altitudes, it must be recognized that the cooling effect of air at these altitudes is somewhat reduced. This will be compensated for by the corresponding drop in temperature which is experienced at the higher altitudes.

In a multiple airborne system all remote control units will be grouped together at the operating center and interconnected by the paralleling cables CBL-AD-5. Interconnections for paralleling will be made as shown in Figure (16).

2-4.3. (Cont.) In a multiple system configuration for airborne use, special attention must be given to the aircraft primary 28 volt DC supply. Each system requires 12 to 15 amperes of current simultaneously. This large demand may place an intolerable load on the power source or on the distribution system. If the limitation is in the power distribution system, additional cabling to the primary source may be sufficient. On the other hand, if the primary power source is inadequate to the large current demand of the multiple system, additional capacity may be obtained by providing each AN/UIH-5 ( ) system with a portable battery. Each battery may then be supplied charging current from the aircraft generators and the large temporary demands of the amplifier systems drawn from the portable batteries.

2-5. Indoor Public Address Installation.

Installation of the AN/UIH-5 ( ) system indoors will generally follow the cabling of Figures (8) or (9). Variations may be expected, depending on whether the installation is intended to be permanent or temporary. An indoor installation may differ from an outdoor installation in the following ways:

A. Generally, indoor installations will require less power. Power reduction may be achieved by reducing the system gain or reducing the DC supply voltage, or both. When a fixed reduction in gain is desired, the gain control on the DE-1492C Amplifier may be set on the first or second position to the right of zero. This permits the two gain controls on the remote control unit to be used normally. Alternately, the primary power supply voltage may be reduced to 16 volts for remote operation and to 6 volts or less without remote operation.

B. Permanent indoor installations will frequently entail the use of a rectifier power supply rather than a battery. The choice of a suitable rectifier supply is important. A supply having good regulation, low ripple content, current capacity of at least 20 amperes, and an impedance of 0.10 ohms or less from 0 to 5000 cps is required to insure satisfactory system performance.

C. Indoor installations may require the use of several speaker units per system in order to disperse sound better at lower levels per speaker. The use of multiple speaker units per system will necessitate special cabling. In wiring special speaker installations, care should be exercised to maintain approximately two ohms minimum impedance per system and all speakers should be connected to operate

2-5. (Cont.) in phase, i.e., the voltage (Pins A to C) of each speaker unit will have the same phase. Figure (14) shows the wiring to use 2 or 4 speaker units with one amplifier.

D. Special cabling may often be provided for indoor systems, especially when they are installed permanently. Such cabling should be done only by experienced personnel, and in accordance with diagrams given in this manual. Power cables and speaker cables should be of #14 wire, or heavier. Input circuits must be carefully shielded and isolation transformers installed where "ground loops" could otherwise disrupt the operation. The use of a remote control unit will normally prevent the flow of ground currents if no additional paths connect the input to the output lines. Speaker lines must be isolated from electrical ground, and the supply voltage should be NEGATIVE ground.

2-6. Outdoor Public Address Installations.

Due to its flexibility, the AN/UIH-5 ( ) Set may be installed more or less permanently as an outdoor public address system. These installations will generally follow one of the configurations given in paragraph 2-2 on ground site installations. The audio power required will determine whether a single or multiple system will be needed. Where a permanent outdoor installation is contemplated, certain recommendations made in Paragraph 2-5 for special indoor installations may be applicable. Due to the generally higher power requirements of an outdoor system, the paralleling of several sets will often be best. The following recommendations apply to special outdoor installations:

A. Supply voltage cannot be increased above 30 volts without risking frequent disruptions from actuation of the protective circuits. Maximum power will be obtained by maintaining the maximum allowable voltage from a supply with very low impedance, high current capacity, and good regulation.

B. Power cables and speaker cables carry very large currents. Losses will be minimized and power increased by the use of high capacity cables between the DE-1492C Amplifier or junction box, the speaker units and the power supply.

C. High power systems are more susceptible to acoustical feedback, thus the sound level must be kept low in the area of microphone operation. The use of many speaker units widely dispersed will help to keep the peak sound level

2-6. (Cont.) down and make the problem of acoustical feedback less severe.

D. As is true in all high gain audio systems, electrical feedback can be induced by very minute stray currents in the input lines. All input lines should be completely shielded and isolation transformers used when necessary to prevent the flow of ground currents in the signal circuits.

SECTION 3

OPERATION

3-1. Operation, General Considerations.

While the AN/UIH-5 ( ) Public Address Set is designed to be highly flexible in application, operation of the set is fundamentally quite simple.

This section provides necessary information on adjustment and setting of normally used operating controls, limitations of operation under various conditions, and general comments on interpreting meter readings as they affect the overall performance of the system.

A discussion of the theory of operation of the AN/UIH-5 ( ) is included in Section 4, along with a detailed presentation of both field and depot maintenance procedures. Therefore, this section will assume that the system has been correctly installed and is in proper operating condition.

Special notice should be taken that simulated, but "silent", operation of the set is possible by use of Test Set FT-1 as described in Paragraph 4-3.2. This method of operation may be desirable when tests producing actual sound are tactically undesirable.

3-2. Operation When Remote Control Unit AEM-CON-1M is NOT Employed.

When the AN/UIH-5 ( ) is installed in a configuration NOT employing the Remote Control Unit CON-1M, the controls and indicators of the Amplifier DE-1492C are used. These controls are shown in Figure (2), and are listed below:

(1) POWER-ON Switch.
(2) GAIN Control.
(3) POWER, PUSH-TO-TEST Lamp.
(4) AUDIO POWER Meter.
(5) MIC Test Jack.
(6) MIC Connector
(7) RECORDER Input connector.
(8) MONITOR Jack.

To place the system in operation, the following steps must be taken:

3-2. (Cont.)

(1) Energize the amplifier by moving the POWER-ON switch to the ON position. Presence of primary power is now indicated by illumination of the POWER, PUSH-TO-TEST lamp in the upper right hand corner of the amplifier panel.

(2) Move the GAIN control fully clockwise if the microphone is to be used. This will establish the necessary conditions for amplifying the voice signal.

(3) Press the PRESS-TO-TALK button located on the Microphone MIC-1 and speak into the microphone. If the system is functioning properly, the amplified voice can now be heard in the speaker unit. Further indication of proper operation is given by deflection of the AUDIO POWER meter on the amplifier panel.

(4) Now, speaking into the microphone in a strong, clear voice, slowly reduce the GAIN control setting until the reading of the AUDIO POWER meter just begins to decrease. Advance the GAIN control just slightly above this point.

(5) If the desired signal is to be applied to the RECORDER input receptacle, the GAIN control should first be rotated to the full counter-clockwise position. (NOTE: The GAIN control has a zero center position. This is provided to permit easy fading from a microphone signal to a recorder or line originated source, while preventing inadvertent mixing of the two input signals.)

(6) Now, reduce the level of the signal from the external source by adjustment of the gain control of the device in use (recorder, receiver, or line) until the reading of the AUDIO POWER meter just begins to decrease. Then, set the gain control of the device just above this point.

(7) The system is now ready to operate from either a microphone or an auxiliary source.

3-3. Operation When Remote Control Unit AEM-CON-1M IS Employed.

In a normal system using Remote Control Unit CON-1M, the main POWER-ON switch located on Amplifier DE-1492C is locked in the ON position, thus transferring control of the system to the Remote Control Unit CON-1M. One other precaution must be taken, however. The master GAIN control on the amplifier must be advanced to the full clockwise setting. Now, all control of the system is transferred to the remote control unit.

3-3. (Cont.) Controls on the CON-1M Remote Control Unit include the following:

(1) POWER-ON Switch.
(2) PUSH TO TEST Lamp.
(3) MIX controls, including REC-LINE and MIC controls.
(4) INPUT Level meter.
(5) OUTPUT Level meter.

To operate from the remote control unit, the procedures listed below should be followed:

(1) Turn the POWER-ON switch on the remote control unit to the ON position. The PUSH TO TEST lamps on both the remote control unit and the amplifier should be illuminated.

(2) Turn the MIC (right hand) control fully clockwise.

(3) Depress the PUSH TO TALK button on the Microphone MIC-1 and speak clearly and strongly into the mouthpiece. Evidence of proper operation is indicated by the amplified sound from the loudspeakers, and also by deflections on both meters of the remote control unit.

(4) Finally, maximum undistorted audio output can be achieved by slowly reducing the MIC control setting while observing the OUTPUT level meter on the remote control unit. A point will be observed where the meter deflection just begins to drop. The control should now be advanced to just above this point.

The system is now adjusted for proper operation from a microphone signal input.

(5) When the input signal is derived from a recorder, radio receiver, or other external source, the procedure above is repeated except for adjustment of the gain control of the external device, and the GAIN control of the remote control unit. In this case, to obtain the most useful signal with the lowest noise level, it is recommended that the REC-LINE control be set at or near its maximum position, and the level control of the external recorder or other device be adjusted for proper output level as described in (4) immediately above.

3-4. Multiple System Operation.

Where the mission requires the use of multiple systems of AN/UIH-5 ( ) sets, each set is configured as a standard set

3-4. (Cont.) operating with Remote Control Unit CON-1M. Thus, basic operating procedures are similar to those of Paragraph 3-3 above. However, an important difference exists in the multiple system. In a multiple system each separate remote control unit is connected essentially in series, or cascade, with the preceding remote control unit, and the input signal is introduced directly into the first remote control unit, only. All other sets receive their inputs from the set preceding them in the cascade chain. This difference requires care in the adjustment of the GAIN controls of the individual sets within a multiple system.

3-4.1. Operating the Multiple System.

To place a multiple system of AN/UIH-5 ( ) sets in operation, proceed as follows:

(1) Energize and adjust the first set in the chain as described in Paragraph 3-3.

(2) Energize and adjust the second set in the chain as above. However, here a difference exists from the procedure of Paragraph 3-3. Due to the method of interconnection employed between sets of a multiple system, the signal for the second and succeeding sets is always introduced through the MIC receptacle (regardless of the nature of signal source; be it microphone, recorder, receiver, or line). Thus, for the second and all succeeding sets in the system only the MIC gain control is used to adjust the audio level of the set.

(3) Energize and adjust the third, and any additional sets in the system as described in (2) above.

(4) If it should be desired to check aurally the performance of each set in a multiple system, this can most easily be accomplished as follows: First, set up the entire system as described above. Then, have an assistant reduce the GAIN controls on all Amplifier DE-1492C panels, except the first, to zero setting. After checking the first system, have the assistant reduce all DE-1492C GAIN controls except the second to zero, and check the second set in the group. Continue in this manner until all individual sets have been separately checked.

(5) The multiple set system should now operate properly.

3-5. System Meters and Monitoring Devices.

The various indicating lamps and meters incorporated in both Amplifier DE-1492C and Remote Control Unit CON-1M are valuable aids to proper operation of the AN/UIH-5 ( ) Public Address Set. For this reason, all operators of the system should study the paragraphs below.

(1) Audio Power Meter (DE-1492C) and Output Level Meter (CON-1M). These meters are extremely useful in obtaining maximum performance from the AN/UIH-5 ( ) Public Address Set.

In a properly adjusted system, normal speech will cause the meter needle to fluctuate between zero and the red mark centered in the meter scale, or slightly above.

Should the meter needle fail to drop to zero between voice peaks, but rather fluctuates over the upper area of the scale, it may indicate several problems. It may be due to excess gain control setting, high input noise level, feedback, or some fault in the system.

Again, if it is noted that the meter needle fails to reach the red mark even on voice peaks it may be that the supply battery is reaching the end of charge condition. This can be verified by increasing the setting of the GAIN control. Should this fail to restore normal meter action, the battery condition should be checked. If battery condition appears normal, further trouble requiring technical assistance is indicated.

(2) Push-to-Test Lamp (CON-1M and DE-1492C). Whenever the system is energized, both Push-to-Test lamps should be lighted. Should both lamps fail to light when the Power-On switch is thrown, it may be assumed that the battery connections have been inadvertently reversed. This may be determined by depressing the lamp on the CON-1M Control Unit. If the lamp on the CON-1M is now lighted, it indicates primary power available to the control unit, but prevented from reaching the amplifier due to a reversed polarity connection.

Should the lamp on the DE-1492C Amplifier extinguish during operation, it is likely that the protective circuits have been actuated by an excess voltage, excess heating, or excessive current drain condition. Switching the POWER-ON switch to the OFF position, and back again to the ON position may restore operation. If so, it can be assumed the fault was caused by a transient condition, and need cause no concern. If, however, manipulating the POWER-ON switch does not restore operation, more serious difficulty may exist requiring the attention of a qualified technician.

3-5. (Cont.) Due to the circuit connections, the PUSH-TO-TEST lamp on Remote Control Unit CON-1M will remain lighted even though the protective circuits have operated. A quick check of the OUTPUT level meter on the CON-1M, which in this situation will show no output, will verify the condition. Manipulating the POWER-ON switch of the CON-1M will disclose whether the malfunction has been caused by a transient, or by a more serious fault requiring technical attention.

(3) LEVEL Indicators on Remote Control Unit CON-1M. There are two level indicators on the remote control unit, one responding to the level of the input signal and the other corresponding to the power amplifier output. During normal operation, the action of these two meters will be very similar. A good operator should study the action of these meters so that he can recognize a variation in the system which may be an indication of trouble or improper setting of controls. For example, a normal INPUT meter indication but a sluggish or low OUTPUT indication would suggest a problem in the amplifier, power supply, or speaker unit. If the OUTPUT level meter continues to fluctuate, but with a lower than usual maximum level, the charge in the battery may be nearly depleted. A higher than usual level indicates a problem in the speaker unit or speaker cable. If neither meter indicates, but the pilot lamp shows the power supply to be normal, trouble can be expected with the input device or the remote control unit. A check with a microphone (or a second microphone if the first is doubtful) will distinguish between a faulty input circuit and a faulty remote control unit.

3-6. Techniques of Voice Transmission.

The success of long distance transmission with the AN/UIH-5 ( ) depends to a great extent not only upon the system, but on the use of proper microphone techniques.

To successfully project the voice over long distances, it is necessary to develop a manner of speaking considerably different from normal conversation. The announcer must talk clearly and distinctly, separating his words with noticeable pauses. He should speak with a strong medium pitched voice with the lips touching the mouthpiece of the microphone. A vent is located at the top of the microphone case. The speaker should be careful not to cover this vent with his hand when pressing the PUSH-TO-TALK button.

Practice and experience will improve the ability of a speaker to transmit his voice. If actual transmissions are impractical, considerable practice can be gained by operating the system into a dummy load, with a speaker or pair of headphones plugged into

the MONITOR jack on the DE-1492C Amplifier, to check voice quality.

3-7. Operation from External Sources.

The differences between operating with a microphone and operating with an external sound source such as a tape recorder, radio receiver, or telephone line are sufficient to merit special treatment.

While using the microphone the operator has almost complete control over his transmissions. Using other devices which are not necessarily designed for use with public address systems will often require additional measures or adjustments to be made to acquire the best performance from them.

A characteristic of external signal sources which may require special attention is the possibility of slow or sudden signal level changes which upset the signal levels previously set up in the system. The operator must be alert to these changes and readjust the gain control to accommodate the new levels. The input level meter on the remote control unit is the logical place to detect such changes. If aural monitoring is desired and none is provided either from the speaker units themselves or from the input signal device, headphones or a small speaker can be connected to the monitor jack on the DE-1492C panel. The use of a speaker or low impedance phones requires a matching transformer in the circuit. In all cases where the monitor jack is used, some reduction of the readings on the OUTPUT level meters is to be expected.

SECTION 4

MAINTENANCE

4-1. General.

In this section, procedures designed to facilitate both field checking and maintenance, and more complex depot maintenance are described. Preliminary to this discussion, however, a clear understanding of the theory of operation of Public Address Set AN/UIH-5 ( ) is required. A detailed presentation of the design and operation of the set follows.

4-2. Theory of Operation, Public Address Set AN/UIH-5 ( ).

Reference to Figure (23) reveals that, fundamentally, the AN/UIH-5 ( ) combines a number of individual units in a rugged, compact, high-powered voice communications set with sufficient flexibility in installation to permit operation in a wide range of applications.

Each of these units is described in the following paragraphs.

4-2.1. Amplifier AEM-DE-1492C.

The circuits of the amplifier DE-1492C may be considered in three sections: (1) the audio amplifier circuits, (2) the monitor circuits, and (3) the protective circuits.

4-2.1.1. Amplifier Circuits.

The amplifier circuits of the DE-1492C Amplifier are principally the input, amplifying, and output sections. The signal to be amplified is introduced into one of two receptacles--the microphone input receptacle or the recorder-input receptacle. In the usual case, signals are introduced through the microphone input receptacle. The signal is applied first to the gain control, a center tapped potentiometer, which can select either of two signals for amplification. The signal from the microphone input receptacle is adjusted by rotating the gain control in a clockwise direction. The adjusted signal from the gain control is fed to the amplifying circuits. First, amplification takes place in the Pre-Amp Module DE-1500 (See Figure (27)) which consists of a single transistor stage followed by a two transistor push-pull stage. The output from the pre-amplifier module is coupled to a push-pull, class B

4-2.1.1. (Cont.) driver stage which generates the power required for the final stage.

The final stage is a bridge amplifier consisting of four power transistors. Correct biases and signals are furnished the bridge from the Driver Module DE-1501, shown in Figure (27). Audio currents in the order of 12 amperes are developed in the bridge and directly coupled to the speaker cables through the power receptacle. Because of the direct coupling, the speaker system must be isolated from ground, otherwise, large direct currents would flow through the speakers and the power amplifying circuits causing damage to both.

4-2.1.2. Monitor Circuits.

The monitor circuits are assembled on the monitor sub-panel, located near the top of the amplifier, as shown in Figure (27). The pilot lamp is of the push-to-test type. With DC power applied to the amplifier chassis, this lamp will be illuminated when depressed, signifying that direct current power is available at the input connection. If, in addition, the power switch is set to the ON position, the protective circuits have not been activated, and the power has been applied in the correct polarity, the push-to-test lamp will illuminate in the normal position.

The output voltage fed to the speaker cables through the power receptacle is also applied to a step down transformer in the monitor circuit. The reduced voltage from this transformer is utilized in two ways. It is directly fed to the output monitor jack to be available when headphones are used. The same voltage is rectified in a small bridge circuit and the DC voltage so obtained is used to deflect the audio power meter. The power meter is calibrated to deflect somewhat above mid-scale when the output voltage is at its maximum level. While not intended for precise measurement, the deflections given by the meter provide an indication of the relative power being fed to a speaker or dummy load. Also, if the speaker load circuit becomes electrically open, the meter will read excessively high and provide an indication that the amplifier is not properly loaded.

4-2.1.3. Protective Circuits.

Certain protective circuits are incorporated in the amplifier to interrupt the operation when safe limits are exceeded. A block diagram of the principal protective circuit components is shown in Figure (24). To prevent damage to the circuits of the amplifier when the primary power is inadvertently connected with reverse polarity, diodes D1 and D2 are inserted in series with the positive terminal of the battery. With battery connections reversed, these

4-2.1.3. (Cont.) diodes drop the impressed voltage to zero, blocking current flow in the circuit.

Also in series with the power circuit from the battery is the power transistor Q9, which serves as a current limiting device as well as a circuit breaker. Transistor Q9 is biased to pass current up to a maximum limiting value, this value being determined by two bias resistors, R4F and R5F. If the current drawn by the amplifier exceeds the maximum limiting value as determined by R4F and R5F, a voltage is generated across transistor Q9, which actuates control transistor Q8. When Q8 is actuated, a regenerative effect is set up which turns transistor Q9 off completely. Thus, excessive currents are prevented from flowing and causing damage to the amplifier.

Two additional means are provided for actuating Q8. One is the flow of current through the Zener diode Z1, which indicates an excessive supply voltage or transients on the DC power line. Zener diode Z1 is set to operate at any voltage in excess of 34 volts, to again protect the amplifier circuits.

Q8 can also be actuated by the action of Q10 which is controlled by four thermistor resistors mounted in capsules near the four transistors of the power amplifier stage. These thermistors are temperature sensitive, and signal Q10 when power stage transistors are heated beyond safe operating limits. These circuits are set to stop operation when the heat sink temperature of the amplifier approaches 150°F.

4-2.2. Junction Box AEM-JB-1C.

The junction box provides the means of interconnecting the various units of the system.

Within this box a relay and three diodes are mounted. The relay, actuated from the remote unit on-off power switch, energizes the system from the DC power source. A small diode blocks the relay coil current if the polarity of the DC power is reversed. A second diode dampens the reverse transient produced by opening the relay coil circuit. A third diode having a higher current capacity is used in the battery charging circuit to block discharge currents from flowing through the charging generator or through inadvertent cable shorts.

Within the junction box is also located a small rectifier unit. This rectifier, a four diode bridge with smoothing capacitor, converts an audio signal, taken from the DE-1492C Amplifier, into a varying DC current for use in the remote control unit-monitor meter.

4-2.3. Remote Control Unit AEM-CON-1M.

The remote control unit provides flexibility to the public address system, allowing the operator to move away from the rack to a distance limited by the length of the remote cables. If ties are to be made with other signal sources, such as telephone lines, these may be located anywhere within the radius of the 100-foot cable. The remote control unit also provides a means for coupling several public address sets together for operation from the same signal source. This signal may be a microphone, tape player, or telephone line. For convenience of operation, most of the controls and monitoring devices found on the Amplifier DE-1492C are repeated in the remote control unit. The way in which the remote control unit functions is described below.

The circuits in the remote control unit fulfill three separate functions. The most complex circuit involves a transistor amplifier to furnish the proper audio signals to the amplifier rack and to other paralleled systems, if any. Other circuits are used to furnish visual input and output level indications and still a third group of circuits furnish the ON-OFF control and DC power to the remote control as well as the power lamp indicator. Input signals are received through one of two receptacles. Signals brought into the left hand connector are coupled to the recorder-line gain control for proper attenuation. The input signal from the MIC jack is given proper attenuation by the MIC gain control. Outputs from the two gain controls are introduced to the transistor amplifier through isolating resistors. Isolation is required to minimize interaction of the two separate input circuits and gain controls.

In the amplifier, the signal is amplified slightly through a single transistor stage having considerable feedback to provide the utmost in stability, minimum phase shift, and distortion. The amplifier also provides DC isolation between input and output circuits to prevent ground currents which could interfere with operation. The output signal from the amplifier is fed through the remote cable to the junction box and the DE-1492C Amplifier. The same signal goes to the paralleling output connector for use by succeeding systems as required.

The output of the single stage amplifier also feeds a meter amplifier. Here, a two transistor circuit generates the varying DC current necessary to actuate the input level meter. The output level meter receives its current through the remote cable from a rectifier bridge in the junction box which, in turn, receives the proper audio voltage from the DE-1492C Amplifier. The output level meter, therefore, gives a direct indication of the DE-1492C power output to the speaker units.

4-2.3. (Cont.) The power ON-OFF switch in the remote control unit operates between a "Hot" line coming from the junction box and a second line which connects to the relay coil. The relay, when energized by the closing of the ON-OFF switch, closes main power contactors to energize the DE-1492C Amplifier circuits. Closing of the relay contacts also energizes a third line in the remote cable which furnishes voltage to the amplifiers and pilot lamp in the remote control unit. The push-to-test lamp connects directly to the "Hot" line when depressed, and so serves to denote battery power available to the junction box. If the battery power is of incorrect polarity, a blocking diode will prevent the relay from closing and the lamp will not operate, unless pressed, even with the power switch in the ON position.

4-2.4. Dynamic Microphone AEM-MIC-1.

The Microphone MIC-1, shown in Figure (3), is a small hand held unit with a press-to-talk button at the upper rear. A dynamic type, it has an electrical output of -55 DBM. It has a noise cancelling aperture at the top of the case which should be left uncovered during operation. MIC-1 is designed for operation in high ambient noise levels, and is highly directional and unresponsive to sources not in close proximity to the mouthpiece.

4-2.5. Loudspeaker Unit AEM-H-92S-4.

This loudspeaker unit is a basic assembly of four speaker drivers and horns assembled on a U-bracket for various methods of mounting. Tripod TP-3 and two types of brackets are furnished with each system for erecting the speaker unit on a flat surface or from the frame of a carrier vehicle.

The four speaker driver units each have an impedance of 8 ohms. Connected in parallel, they furnish the proper 2 ohm impedance to the DE-1492C Amplifier. Maximum power rating per driver unit is approximately 75 watts.

4-2.6. Portable Battery.

The battery used with the public address set is a nickel cadmium type, used because it is lighter in weight than the more familiar lead-acid type. Twenty nickel cadmium cells give a nominal terminal voltage of 24 volts, which rises to 28 volts during charging. This voltage is sufficient to operate the amplifying system for a period of 1 to 2 hours depending on the average power transmitted as well as the charge condition of the battery.

4-3. Field Maintenance.

This section assumes a thorough familiarity with the test equipment and the indicating devices. It is assumed that field maintenance will involve only minor repairs or replacement of major system units. More thorough trouble shooting techniques and detailed replacements are explained in Paragraph 4-4 on Depot Maintenance. Reference to the applicable system assembly and cabling diagrams was covered in Section 2 of this manual.

Personnel engaged in the testing and maintaining of the public address set should be thoroughly familiar with all the preceding sections of this manual.

4-3.1. Test Equipment for Field Maintenance.

Test Set AEM-FT-1 is provided for checking and servicing the AN/UIH-5 ( ) Set. A picture of the test set appears in Figure (6). A schematic of the Test Meter TE-1421 and of the resistive Dummy Load TE-1422 appears in Figure (42). The use of this test meter for periodic checking and servicing of the public address set is covered in the remaining paragraphs of this section.

The monitoring devices which are an integral part of the operating system are also a valuable aid in system checking and fault location.

4-3.2. Routine System Checks.

Daily checks are encouraged as a means of developing a greater understanding of the system and of recognizing incipient problems, both of which will lead to more satisfactory use of the system.

Test Set FT-1, consisting basically of two meters and a resistor, affords an excellent means of performing a quick and simple daily check of the system, yet which is sufficiently sensitive to be meaningful.

To prepare the system for test, remove Cable Connector CBL-1H (or CBL-1-15) from the input power connector on the amplifier rack junction box. Insert Test Meter TE-1421, as shown in Figure (17). Also connect Dummy Load TE-1422 as shown in Figure (17). The power developed by the amplifying system will now be absorbed by the dummy load, the speaker unit being disconnected from the system.

Now, energize the system as for normal operation with Microphone MIC-1. Give a test count into the microphone. Read and

4-3.2. (Cont.) record the maximum values of DC current and 'AC' voltage. Note and record any unusual indications of the input and output power level meters. Now connect CBL-20 (or CBL-100) from speaker unit into Test Meter TE-1421 in place of the Dummy Load TE-1422. Repeat the preceding steps using the speaker in place of the dummy load.

If the system appears to be normal, disconnect test meter and reconnect the system for operation.

If desired, certain quantities can be computed from the readings and entered in the daily log. These quantities are as follows:

A. Input Power. Power into the system is equal to power supply voltage (normally 28 volts) times the DC current read on the TE-1421 meter.

B. Output Power. Output power is equal to the square of the AC voltage read on Meter TE-1421 divided by 2 (Load Impedance).

C. Efficiency of the set is given by the output power multiplied by 100 and divided by the input power.

A suggested form for the Daily Log is shown in Figure (25). The significance of the daily checks is to determine whether the values as obtained are comparable to those expected, and more significantly, to determine the day by day variations which may be indicative of deteriorations in the components or the power source. Typical values to be expected are shown in Figure (25). Some variation from these readings will be experienced due to variation between systems, power source voltages and impedances, temperature extremes, and other influences.

The most rapidly changing characteristic of the system is due to its battery condition. When both the input power and the output power are below the expected levels, the supply voltage is the first thing to check. On the other hand, an extremely high input power and output power reading might indicate that the supply voltage has reached a point of overcharge, and charging should be reduced or discontinued. Other combinations of readings indicating more serious faults in the system are discussed in a following paragraph on component checks.

4-3.3. Care and Precautions.

The transistors of the system are subject to damage when exposed to excessive heat, voltage, or current for even short periods

4-3.3. (Cont.) of time. The system design incorporates various protective circuits which actuate when safe operating currents, voltages, or temperatures are exceeded. However, the protective circuits, themselves, are vulnerable when extreme or sustained stresses are allowed to exist. Therefore, careful monitoring of source voltages and system indicators to prevent the occurrence of such extreme conditions will greatly prolong the useful life of the equipment. Principal damaging conditions are: excessive battery charging voltages, high temperature operation, inadequate cooling of the system, transmission of compressed high level music and transmissions containing a high noise content.

4-3.4. Component Checks.

Field maintenance of the system consists of three sequential actions: Namely, to observe the symptoms of trouble, to locate the faulty component, to repair or replace the faulty component. The system is then operationally checked, and if found satisfactory the repair action is successful. If unsuccessful, the same three steps are repeated until success is achieved.

In the complete AN/UIH-5 ( ) Set, including test equipment, there are many points of indication available to indicate the operating condition of the many circuits and components necessary for satisfactory operation. Reference to the maintenance charts of Figure (26) shows the indication to be expected from each monitoring point in the system and the test meter readings when many of the most common faults occur in the system. Such a table cannot be all inclusive or precise, and troubles cannot be expected to follow an exact pattern. In exceptional cases, field maintenance must proceed on a most logical basis and this to a great degree will depend on the experience and familiarity of the technician.

Maintenance by substitution or elimination can often be used to good advantage to locate the faulty system unit. Where like units of an operating system are immediately available, direct interchange of units between the good and faulty systems may provide the most rapid way for detecting the specific item at fault. In the more typical case, where a single system exists, many substitutions and trials by elimination are still available. These methods are outlined below.

A. Cable substitution. Most of the cables in the system have functional duplicates. Therefore it is possible to substitute a long cable for a short one, or vice versa.

B. Dummy load for speaker unit. Resistive Dummy Load TE-1422 is the electrical equivalent of the Speaker Unit

4-3.4. (Cont.)

H-92S-4. Therefore it can be substituted for the speaker when that unit is suspect.

C. Operation without remote unit. If trouble is suspected in the CON-1M Remote Control Unit or the amplifier rack Junction Box JB-1C, these units may be eliminated from the system by removing the Amplifier DE-1492C from the amplifier rack and cabling the simplified system shown in Figure (13). Satisfactory operation thereafter indicates that the system fault is in the eliminated units.

D. Use of alternate audio source. Where tape recorders, radio receivers, or telephone lines are available they may be substituted for the microphone when this unit is suspect.

The diagrams of Figure (22) show the proper pin connections for all system cables. Where test equipment is available in the field, a check of the proper cable continuity will allow the faulty cable to be detected.

An ohmmeter touched across the speaker input terminals should cause an audible click in the horn. More tests of the speaker unit are detailed in Paragraph 4-4.3.4.

4-3.5. Power Supply Checks.

Effective operation of the AN/UIH-5 ( ) Public Address Set is heavily dependent upon the state of the power supply. When operation is solely dependent on the portable battery, it is most important that this battery be kept in maximum state of readiness for detached operation away from any charging source. The operation will suffer greatly if the battery is not fully charged. Charging the battery may be done while mounted in the rack through Charging Cable BC-10. Such a charging circuit is shown in Figure (12). Battery charging may be done periodically after 1 to 3 hours of use, or the battery may be floated continuously on the line. It is to be noted that floating the battery on the charging line may not insure full charge at all times, thus it may require periodic additional charging.

Maintaining the proper capacity of the battery requires discharging as well as charging. Nickel cadmium batteries are known to lose their capacity if left too long a time unused, even though fully charged periodically. Therefore, it is advisable to frequently operate the system from the battery until depletion indications are observed.

Nickel cadmium batteries will withstand rugged use but will

4-3.5. (Cont.) react adversely to certain conditions not normally affecting the more familiar lead-acid types.

The following precautions should be observed:

A. Do NOT use syringes or water containers that have been used with lead acid batteries.

B. Do NOT fill nickel cadmium cells with any liquid other than pure distilled water.

C. Do NOT add water to cells until they are fully charged. (Otherwise cells will overflow upon charging.)

D. Do NOT keep nickel cadmium batteries floating on the line for long periods of time. It is important to exercise batteries, that is, run them down between charging cycles frequently to maintain their capacity. A "high resistance" battery will decrease system output power.

4-4. Depot Maintenance.

The paragraphs of this section go into more detail as to servicing procedures to be followed in depot maintenance, where it can be expected that more complete test facilities and repair parts supplies are available to the technician.

4-4.1. Test Equipment for Depot Maintenance.

Depot maintenance of the system will follow very closely the procedures outlined for field maintenance previously. These procedures would very likely be carried out on a "mock up" system maintained for rapid check of suspected components brought in for maintenance work. The bench "mock up" of the system can be cabled as shown in Figure (18). This test set up consists of a complete system with Test Meter TE-1421 and Dummy Load TE-1422 inserted in the system. While all operational checks of the system can be made with the test set up shown in Figure (18), more detailed examination of the circuitry will in general require additional test equipment. The following standard test equipment, found in most electronic service shops, will be found useful in servicing the public address set components:

DC Voltmeter (Simpson Model 260, or equivalent). 0-30 Volts DC.

AC Voltmeter (Ballantine Model 300, or similar). 0.001 to 100 Volts.

4-4.1. (Cont.)

Audio Signal Generator (General Purpose Type)

Cathode Ray Oscilloscope (General Purpose Type)

Attenuator Network (See Figure (19)).

Figure (19) shows more complete instrumentation set up for shop testing the electronic circuits. Certain dangers are inherent in the use of shop test equipments which are not normally encountered in field use. Therefore, the following paragraph on care and precautions in shop practices should be carefully studied before making any maintenance checks in the shop.

4-4.2. Precautions in Shop Maintenance.

To avoid serious damage to system components while undergoing shop testing read carefully the material presented below.

A. CAUTION: Always pre-test Amplifier DE-1492C with 12 volts DC supply voltage when its condition is doubtful. This precaution alone will prevent the destruction of many expensive components.

B. CAUTION: Do not drive the amplifier system at maximum power output continuously. The DE-1492C Amplifier is conservatively rated at 0.2 duty cycle.

C. CAUTION: Do not operate the system from an inadequate power supply or a shop supply giving rise to high voltage transients.

D. CAUTION: Never solder or unsolder transistor connections without properly applying a heat sink.

E. CAUTION: Careless poking around with a screwdriver in a live transistor circuit can cause extensive damage. Even momentary large currents or voltages through transistors can permanently damage the unit.

F. CAUTION: The use of many test instruments connected to various points in a high gain circuit can lead to undesirable oscillations. Therefore, great care should be taken to isolate instrumented circuits to prevent feedback through input cable connections. Shielded lines should be used on all input signal cables. It is important to note that the AC power lines to the speaker or dummy load are both at an average potential of 14 volts above the negative ground. Therefore, AC operated test equipment with cases

4-4.2. (Cont.) all tied to a common ground can create a shorted condition on the system when measuring system output voltages.

4-4.3. System and Component Checking.

4-4.3.1. System Checks.

System checks can be completely made by using the equipment and cabling shown in Figure (18). As more detailed trouble shooting will often benefit from use of a more elaborate test set up, some or all of the equipment shown in Figure (19) may be added for tests.

The use of measured input levels from an audio generator and the observation of wave forms on an oscilloscope will be important in many cases. The following input levels to the remote control unit are the nominal values used for testing maximum output of the system at 1000 cps: ten millivolts, pins A to C, at the MIC input receptacle; 300 millivolts (balanced), pins A to B; or 1000 millivolts (1 volt), pins A to C, at the recorder-line receptacle. 22.5 volts across the 2 ohm dummy load gives the rated output power of 250 watts. The voltage waveform of the system at maximum power is very nearly a square wave. The output voltage wave form should be very nearly sinusoidal at the 50% power level.

4-4.3.2. Amplifier Checks.

The DE-1492C Amplifier is the most complex of the AN/UIH-5 ( ) system units. A study of the description and theory of operation presented earlier in this manual, and of the schematic diagram shown in Figure (38) should precede any trouble shooting action. The various views shown in Figure (27) show the location of the replaceable components in the amplifier chassis, and the table of Figure (37) gives a complete description of all replaceable parts. Test points under the removable side panels of the amplifier chassis are more clearly indicated in the drawing of Figure (30).

Checks which will lead to rapid analysis and location of a faulty part in the amplifier should follow the step-by-step routine below:

A. 12 volt operational check.

B. 12 volt voltage measurement check.

C. Faulty part resistance check.

4-4.3.2. (Cont.)

D. Faulty part replacement.

E. Operational check.

If the sequence has led to a successful repair, it terminates with a satisfactory operational check. If, however, the check of step E indicates additional trouble, the sequence must be repeated. The directions for performing each of these steps is explained below.

4-4.3.2.1. 12 Volt Operational Check.

Connect to the amplifier to be tested a Microphone MIC-1, a 12 volt power source, and the FT-1 test equipment as shown in Figure (20). Observe the meters and indicators while making a test count. Note the deviation in these readings from the normal readings given in the table below.

NORMAL READINGS AND INDICATIONS WHEN OPERATING DE-1492C AMPLIFIER FROM A 12 VOLT SUPPLY

Indication	Normal Reading
No Signal — Battery Current	.5 amperes, DC
No Signal — Output Voltage	0 volts, AC
Maximum Signal — Battery Current	5 amperes, DC
Maximum Signal — Audio Power Meter	10 volts, AC
Maximum Signal — Audio Power Meter	Slight deflection
Pilot Lamp — Not Pressed	Dull Red
Push-to-Test Lamp	Dull Red

Those readings which deviate from the normal values will indicate the area of the fault, whether (1) amplifier circuits, (2) protective circuits, or (3) monitor circuits.

If trouble is traced to the monitor circuits, continuity checks with reference to the schematic of Figure (38) will isolate the defective part. If trouble is traced to the protective or amplifier circuits, a visual check should be made for overheated parts or connections which point to a specific breakdown point in the amplifier.

Lacking other evidence, a faulty transistor or diode may be suspected. The transistors most likely to fail are the bridge transistors, Q1, Q2, Q3, and Q4. Failure of transistor Q9 in the protective circuit will most likely be the result of a short circuit of some other component.

4-4.3.2.1. (Cont.) Correct assessment of the indications given by the operational check requires understanding of the circuits for full interpretation. Among the most common faults, however, a power transistor with an emitter-collector short will generally result in a larger than normal battery current with no signal applied and less than normal output voltage with signal applied. A power transistor with an open base connection will draw less than the usual amount of no signal current as well as producing less than normal AC output voltage.

4-4.3.2.2. 12 Volt Measurement Check.

Voltage measurements provide the most positive indications of a faulty transistor in the bridge power output circuit involving Q1, Q2, Q3, and Q4. The table of Figure (33) shows the normal DC voltages to be expected at the test points of Figure (30) when 12 or 28 volts are applied to the amplifier.

First tests should be made at 12 volts. If no significant troubles are detected with 12 volts, the voltage may be increased to 28 volts and the readings repeated.

If again, no significant deviations from the normal voltages are noted, measurements at Q3C and Q4C should be made during speech transmission. A variation here of more than 20% from the normal value will indicate a failure of the power transistor to operate properly under load even though it might appear normal in all other respects.

4-4.3.2.3. Resistance Checks.

Resistance checks are used to pinpoint the defective part and make doubly sure of its failed condition before removal. Figure (31) gives the resistance readings across all the removable transistors and diodes as well as other points of possible failure. In addition, Figure (32) shows the nominal resistance readings between certain pins on the power plug, P3 of the audio amplifier. The effect produced on these readings due to several possible failures is also shown.

It is important to recognize that many factors will influence the resistance of semi-conductor devices. For example, if measurements are made at temperatures much above or below normal room temperature (about 70°F), the readings must be compared to similar readings taken on a sample known to be good. Resistance values will also vary with the test instruments being used, the multiplier scale, and polarity of test leads. Also, some allowance must be made for variations of the parts themselves.

4-4.3.2.4. Protective Circuit Adjustment.

When amplifier repair results in the replacement of transistors Q8 or Q9, testing and readjustment of the protective circuits is necessary. This can be performed using Special Test Set AEM-TE-1424 (supplied as a Depot Maintenance Test Unit), or in the field without the special test set.

Procedures for both situations are described in the following paragraphs.

Depot (Using Test Set TE-1424)

Step 1. Connect Amplifier DE-1492C, Test Set TE-1424, Dummy Load TE-1422, and Microphone MIC-1 to a 28 volt DC supply as shown in Figure (21).

Step 2. Turn POWER-ON switch on DE-1492C Amplifier to the ON position, being certain to leave the test switch on TE-1424 Test Set in its normal center position. The Amplifier should operate normally, if necessary repairs have been successful.

Step 3. Move the test switch on TE-1424 to POS-1, and while holding the switch in this position, speak into the microphone. The amplifier should continue to operate normally.

Step 4. Now, move the test switch to POS-2, again speaking into the microphone. At this point, the protective circuits in the DE-1492C Amplifier should activate, causing the amplifier to cease functioning.

Step 5. If, however, the test of Step 4 does not activate the protective circuits, an adjustment is required on resistor R4F (the 90 ohm power resistor located under the rear cover plate of the DE-1492C Amplifier). The tap on resistor R4F should be loosened and moved slightly toward the shorted end, increasing the resistance of R4F. Again, repeat the test of Step 4 until the proper setting of R4F is found. Lock the sliding tap in this position.

Step 6. If the test of Step 3, above, does activate the protective circuit, the value of R4F must be decreased (moving the tap toward the open end).

Step 7. Following either adjustment of Steps 5 or 6, retest the amplifier for proper operation. That is, the amplifier should not activate the protective circuits in Step 3, but should be actuated by the test of Step 4. Readjust as required to meet these conditions.

4-4.3.2.4. (Cont.) Depot (NOT using TE-1424)

Step 1. Connect the Amplifier DE-1492C to a 28 volt DC supply, with Dummy Load TE-1422 and Microphone MIC-1. Also, connect a 4 ohm, 200 watt resistor between test point Q9C and the negative terminal of the power supply.

Step 2. Now, turn the POWER-ON switch to ON and make a test count into the microphone. This should cause the protective circuits to actuate.

Step 3. For this test, add a 1 ohm, 25 watt resistor in series with the 4 ohm resistor previously used. Now, again energize the amplifier and test by speaking into the microphone. With the added resistance, the protective circuit should not operate (the amplifier should NOT cut off).

Step 4. If the amplifier protection circuits do not operate as above, proceed as follows:

(a) If the protective circuit failed to operate in Step 2 (4 ohms) adjust R4F as noted in Step 5 (in paragraph above).

(b) If the protective circuits do operate in Step 3 (5 ohms), adjust R4F as in Step 6 (in paragraph above).

Under either set of tests above, the amplifier is now adjusted properly to insure correct action of the protective circuits.

4-4.3.2.5. Other Checks and Adjustments.

If more precise performance tests are to be performed on the amplifier, reference should be made to the specification information in Section 1. Quantitative performance testing can be done with the set up shown in Figure (19).

4-4.3.3. Remote Control and Junction Box Checking.

Trouble shooting the Remote Control Unit CON-1M and the amplifier rack Junction Box JB-1C is most conveniently done with these two components cabled in the normal way. Circuits of the remote control unit are readily made available by removal of the case which is retained to the remote unit frame and front panel by a single screw in each end. The cover plate on the junction box can be removed by loosening two screws located on the cover. The circuits for these two units are shown in Figures (39) and (40). Component part locations are shown in the photograph of Figures (28) and (29).

4-4.3.3. (Cont.) Input signal levels for testing the remote unit at 1000 cps are the same as those specified for amplifier testing in Paragraph 4-4.3.1.

The output signal level from the remote unit can be measured between pins A and C at the input signal connector of the Amplifier DE-1492C, or the paralleling cable connector. With standard input signals and full gain, output should be 10 to 20 millivolts.

4-4.3.4. Speaker Unit Checks.

Speaker unit H-92S-4 consists of four 8-ohm speaker drivers with coils connected in parallel. The DC resistance of this combination measured at the input connector is 0.9 ± 0.1 ohms at normal room temperature. Each voice coil of an individual driver will measure 3.6 ± 0.4 ohms at room temperature.

Electrical insulation is provided between the speaker mounting frame and the magnetic cup (in heat sink) at the rear of the speaker unit. A resistance check should show this insulation to be at least 1 megohm. A resistance of at least 1 megohm should also be measured between the voice coil connections and both the speaker frame and magnetic cup. Further speaker tests are described at the end of Paragraph 4-5.3.

4-5. Replacement Instructions.

In the DE-1492C Amplifier chassis are two replaceable module assemblies. (See Figure (27)). Each module is secured to the supporting circuit board by guide pins and retaining screws. By removing the screws at the top of the pins, the modules will slide straight away from the circuit board. Use a slight rocking motion to disengage the mating connector pins and start the action.

4-5.1. Transistors.

The transistors used in the AN/UIH-5 ( ) system may be classified as either low-power or high-power. All low-power transistors are mounted by three leads arranged as shown in Figure (34). Three low-power transistors are mounted on the circuit board of the amplifier section in the remote control unit. One other low-power transistor is mounted on the chassis of the DE-1492C Amplifier as shown in Figure (27), designated as Q10. Replacement of low power transistors is similar to the replacement of other components, with one important exception, namely, the need to protect the transistor from soldering heat. Before the heat of soldering is applied to transistor leads, a metal clamp must be fastened to the lead between the point of soldering and the transistor

4-5.1. (Cont.) case. This clamp, which may be the jaws of a pair of long-nose pliers, will drain the heat from the lead before it enters the transistor.

All the high-power transistors used in the system are mounted on the aluminum chassis of the DE-1492C Amplifier. These transistors, designated as Q1 through Q9, can be located by reference to Figure (27). Terminal arrangements are shown in Figure (34). All high-powered transistors must be mounted with good thermal contact to the aluminum chassis to dissipate the considerable heat associated with their high power. Between the mounting base of each power transistor and the chassis is inserted a mica insulator to isolate the transistor case from the chassis. Whenever a power transistor is replaced, it is important to use a new mica washer to assure good contact, with good electrical insulation of the new mounting. Silicone grease is often used to improve the heat conducting qualities of the mica mounting. Extreme care should be exercised to keep foreign matter from sticking to the mounting surfaces which could perforate the mica under pressure, and cause voltage breakdown. Insulating washers used on the mounting bolts should be carefully centered before being tightened. Before the leads are attached to the new transistor, it is well to test the insulation of the mounting with a leakage tester applying 50 to 100 volts across the insulation.

Heat sinking the transistor terminals while soldering is equally important with high power transistors.

4-5.2. Circuit Board Components.

Replaceable parts are mounted on insulating boards and circuit boards by two methods. Figure (27) shows the replaceable parts of the DE-1492C Amplifier where parts are mounted to terminals swedged on the board. These terminals provide a strong mechanical tie for the leads prior to soldering. Removing a faulty part from this board will require a twisting motion on the lead while applying heat from the soldering iron. In replacing the new part, the excess solder should be removed from the terminal. Then with a loop formed in the lead of the part, press tightly about the terminal to give a firm mechanical bond. A flow of solder to the joint then gives a good electrical contact.

Replaceable parts on the circuit board located in the remote control unit are in many cases mounted with their leads projecting through the board and soldered to a copper laminate on the under side.

A faulty part can be removed by pulling the lead with pliers while applying heat to the joint on the opposite side of the board.

4-5.2. (Cont.) Replacing a new part is accomplished by inserting its leads through the mounting holes, flattening them to give a good mechanical bond, and trimming them with diagonal cutters about 1/16 inch from the mounting hole after soldering the joint.

4-5.3. Voice Coils.

Disassemble the speaker unit by first releasing the leads from the rear connector assembly on the speaker unit and then unscrewing the re-entrant horn section to release the driver unit. See Figures (35) and (41).

CAUTION: Washers around the driver neck and inside the throat have been used to properly mount the driver to the unit. These must be retained for reassembly of the unit.

Place the driver assembly in the middle of a clean work area, free of all filings and chips, and withdraw the six screws securing the head assembly. Carefully inspect the lead and coil placement of the old diaphragm before unsoldering.

To install new diaphragm, place sound chamber on the bench, screen down, and the No. 2 terminal to the right. Place diaphragm on pins so that slit on voice coil form is away from you. Shape leads and solder. Exercise care not to put any sharp bends in the voice coil leads.

Next inspect voice coil gap for dirt or metal chips. To remove dirt from gap, use a cleaning shim and masking tape. Fold the marking tape over the shim, so that the adhesive is exposed. Insert the shim in the gap and work around, trapping foreign matter on the tape. Change tape as required and make sure no adhesive from the tape is left in the gap. Before assembly of the voice coil to the magnetic assembly, inspect coil for dirt or strings of cement. Place rubber gasket on sound chamber and assemble unit.

Test the assembled unit by using the speaker as a microphone with an amplifier speaker monitoring for noise of voice coil dragging or foreign matter in the gap. Use a hydrometer bulb, palm of hand, or pressure from mouth to slowly actuate diaphragm during this test.

SECTION 5

PREVENTIVE MAINTENANCE INSTRUCTIONS

5-1. Scope of Maintenance

The maintenance duties assigned to the operator of Public Address Set AN/UIH-5 are listed below, together with a reference to the paragraphs covering the specific maintenance functions. The tools and test equipment required are listed in appendixes (II and III).

a. Daily preventive maintenance checks and services (para 5-4).

b. Weekly preventive maintenance checks and services (para 5-5).

c. Quarterly preventive maintenance checks and services (para 5-6).

d. Cleaning (para 5-7).

e. Touchup painting (para 5-8).

5-2. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 5-4 through 5-8 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (para 5-4, 5-5, and 5-6) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat-serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the References column lists the illustrations, paragraphs, or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by performing the corrective actions listed, higher echelon maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

5-3. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the equipment are required daily, weekly, and quarterly.

a. Paragraph 5-4 specifies the checks and services that must be accomplished daily (or at least once each week if the equipment is maintained in standby condition).

b. Paragraphs 5-5 and 5-6 specify additional checks and services that must be performed on a weekly and quarterly basis, respectively.

5-4. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Completeness	See that the equipment is complete (fig. 1) (Appx III).	None.
2	Exterior surfaces	Clean the exterior surfaces, including the panel and meter glass (para 5-7). Check all meter glass for cracks.	None.
3	Connectors	Check the tightness of all connectors.	None.
4	Controls and indicators....	While making the operating checks (item 5), observe that the mechanical action of each knob, dial, and switch is smooth and free of external or internal binding, and that there is no excessive looseness. Also check the meters for sticking or bent pointers.	None.
5	Operation	Operate the equipment according to section 3.	None.

5-5. Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Cables	Inspect cords, cables, and wires for chafed, cracked, or frayed insulation. Replace connectors that are broken, arced, stripped, or worn excessively	None.
2	Handles and latches	Inspect handles, latches, and hinges for looseness. Replace or tighten as necessary.	None
3	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Touch up paint as required (para 5-8).	None
4	Battery and compartment.....	Inspect the battery for loose terminals and leakage. Check the compartment for correction.	None.

5-6. Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Jacks	Inspect jacks for snug fit and good contact.	
2	Transformers	Inspect terminals on transformers. All nuts must be tight. There should be no evidence of dirt or corrosion.	

5-6. Quarterly Preventive Maintenance Checks and Services Chart (cont)

Sequence No.	Item	Procedure	References
3	Resistors and capacitors	Inspect resistors and capacitors for cracks, blistering, or other detrimental defects.	
4	Gaskets and insulators	Inspect gaskets, insulators, bushings, and sleeves for cracks, chipping, and excessive wear.	
5	Publications	See that all publications are complete, serviceable, and current.	DA Pam 310-4.
6	Modifications	Check DA Pam 310-4 to determine whether new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	TM 38-750 and DA Pam 310-4.
7	Spare parts	Check all spare parts (operator and organizational) for general condition and method of storage. No overstock should be evident and all shortages must be on valid requisitions.	

5-7. Cleaning

Inspect the exterior of the equipment. The exterior surfaces should be clean, and free of dust, dirt, grease, and fungus.

a. Remove dust and loose dirt with a clean soft cloth.

Warning: Cleaning compound is flammable and its fumes are toxic. Provide adequate ventilation. Do not use near a flame.

b. Remove grease, fungus, and ground-in dirt from the cases; use a cloth dampened (not wet) with Cleaning Compound (Federal stock No. 7930-395-9452).

c. Remove dust or dirt from plugs and jacks with a brush.

Caution: Do not press on the meter face (glass) when cleaning; the meter may become damaged.

d. Clean the front panels, meters, and control knobs; use a soft clean cloth. If necessary dampen the cloth with water; mild soap may be used for more effective cleaning.

5-8. Touchup Painting Instructions

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing paractices specified in TM 9-213.

APPENDIX I

REFERENCES

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 4, 6, 7, 8, and 9), Supply Bulletins, Lubrication Orders, and Modification Work Orders.
TM 9-213	Painting Instructions for Field Use.
TM 38-750	The Army Equipment Record System and Procedures.

APPENDIX II

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

a. This APPENDIX assigns maintenance functions to be performed on components, assemblies, and subassemblies by the lowest appropriate maintenance category.

b. Columns in the maintenance allocation chart are as follows:

(1) Part or component. This column shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the component. Components, assemblies, and subassemblies are listed in top-down order. That is, the assemblies which are part of a component are listed immediately below that component, and the subassemblies which are part of an assembly are listed immediately below that assembly. Each generation breakdown (components, assemblies, or subassemblies) is listed in disassembly order or alphabetical order.

(2) Maintenance function. This column indicates the various maintenance functions allocated to the categories.

(a) Service. To clean, to preserve, and to replenish lubricants.

(b) Adjust. To regulate periodically to prevent malfunction.

(c) Inspect. To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

(d) Test. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(e) Replace. To substitute serviceable components, assemblies, or subassemblies, for unserviceable components, assemblies, or subassemblies.

(f) Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

(g) Align. To adjust two or more components of an electrical system so that their functions are properly synchronized.

(h) Calibrate. To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(i) Overhaul. To restore an item to completely serviceable condition as prescribed by serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(j) Rebuild. To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements using original manufacturing tolerances and/or specifications and subsequent reassembly of the item.

(3) 1st, 2d, 3d, 4th, 5th, echelons (operator, organization, direct support, general support, and depot). The symbol X indicates the categories responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Categories higher than those marked by X are authorized to perform the indicated operation.

(4) Tools required. This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) Remarks. Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding columns.

c. Columns in the allocation of tools for maintenance functions are as follows:

(1) Tools required for maintenance functions. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) 1st, 2d, 3d, 4th, 5th echelon (operator, organization, direct support, general support, and depot). The dagger (†) symbol indicates the categories normally allocated the facility.

(3) Tool code. This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal services organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to an including general support are authorized to the organization operating this equipment.

SECTION II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON O/C	O	DS	GS	D	TOOLS REQUIRED	REMARKS
PUBLIC ADDRESS SET AN/U1H-5	service	X						Exterior
			X				8	
	adjust	X						Adjusts operating control
			X				6,8	Adjusts protective circuit overload
	inspect	X						Exterior
			X				8	
	test	X						Tests amplifier output using, "Test Set Amplifier Model "AEM-FT1 P/O NH/U1H-5"
			X				2	Continuity cables, cords, lamps, battery cells and battery voltage
					X		1,3,4,5,6,10	All Tests
	repair		X				8	Replace: battery cells, cords, connector driver, horn, knobs, lamps, microphone, Pic Amplifier, speakers
					X		7,9	All repairs
	overhaul				X		7,9	
AMPLIFIER-MODEL NR1492C	service	X						Exterior
			X				8	
	adjust	X						Adjusts operating control
			X				6,8	Adjusts protective circuit overload
	inspect	X						Exterior
			X				8	
	test	X						Tests amplifier output using "Test Set Amplifier Model "AEM-FT1 F/O AN/U1H-5"
			X				2	Continuity of cords, cables, lamp
					X		1,3,4,5,6,10	All tests
	repair		X				8	Replaces driver, knob, lamps, Pre Amplifier Unit
					X		7,9	All repairs
LOUDSPEAKER MODEL NR AEM-H92S-4	service		X				8	
	inspect		X				8	
	test		X				2	Continuity
	repair		X				8	Replaces: connectors, horn, speaker driver
			X				8	All repairs
MICROPHONE MODEL NR AEM-M1C-2	service		X				8	
	inspect		X				8	
	test		X				2	Continuity
	repair		X				8	Replace: connector, cord
			X				8	All repairs
REMOTE CONTROL UNIT MODEL NR AEM-CON-1M	service		X				8	
	adjust	X						Adjusts operating control
	inspect		X				8	
	test		X				2	Continuity, cords, cables, lamps
					X		2	All tests
	repair		X				8	Replace: knob, lamp
					X		7,9	All repairs

SELMS Form 1151 1 Apr 64 (Replaces SELMS 004 TP, which is obsolete)

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON O/C	O	DS	GS	D	TOOLS REQUIRED	REMARKS
AN/U1H-5 (continued)								
TEST SET, AMPLIFIER, MODEL NR AEM-FT1	service		X				6	
	adjust	X						Adjusts operating switches
	inspect		X				6	
	test		X				2	Continuity cables, cords
					X		3	All tests
	repair		X				6	Replace: connectors, cords
					X		7	All repairs

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHELON					TOOL CODE	REMARKS
	O/C	O	DS	GS	D		
AN/UkH-5 (continued)							
AUDIO OSCILLATOR TS-382/U				†	†	1	
MULTIMETER AN/URM-105		†				2	
MULTIMETER TS-352/U				†	†	3	
MULTIMETER ME-26B/U				†	†	4	
OSCILLOSCOPE OS-46/U				†	†	5	
DUMMY LOAD, ELECTRICAL DA-359/U		†		†	†	6	
TOOL KIT, RADAR AND RADIO REPAIRMAN TK-87/U				†	†	7	
TOOL KIT, RADIO REPAIRMAN TK-115/G		†				8	
TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G				†	†	9	
VOLTMETER, ELECTRONIC ME-30/U				†	†	10	

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. General

This appendix lists items supplied for initial operation. The list includes tools, parts, and material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

2. Columns

Columns are as follows:

a. Federal stock number. This column lists the 11-digit Federal stock number.

b. Designation by model. Not used.

c. Description. Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

d. Unit of issue. The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

e. Expendability. Nonexpendable items are indicated by NX. Expendable items are not annotated.

f. Quantity authorized. Under "Items Comprising an Operable Equipment", the column lists the quantity of items supplied for the initial operation of the equipment.

g. Illustrations. Not used.

SECTION II. FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
5830-082-4126		PUBLIC ADDRESS SET AN/UIH-5: 250 w output power reqt. DC 28v total weight not to exceed 50 lbs.		NX			
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
ORD thru AGC		TECHNICAL MANUAL TM 11-5830-240-15			1		
5830-691-2398		AMPLIFIER, AUDIO FREQUENCY: 250w power output 28 vdc 300 to 5000 cps, normal operating freq range 3 channels 50 ohms 1 channel 600 ohms one channel, 2000ohms one channel, 50 ohms output impedance; Applied Electro Mechanics, Inc. part #AEM-DE1492C		NX	1		
5995-681-3150		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL, BRANCHED: #14 AWG, 15 ft lg; Applied Electro Mechanics, Inc. part #AEM-CBL-1-15			1		
5995-985-8001		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: 2 conductors, stranded, #14 AWG 100 ft lg o/a; Applied Electro Mechanics Inc. part #AEM-CBL100			1		
5995-985-8002		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: 2 conductors, stranded, #26 AWG 5 ft lg o/a; Applied Electro Mechanics, Inc. part #AEM-CBL-AD5			1		
5995-985-8003		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: 10 conductors, stranded, #22 AWG 100 ft lg o/a; Applied Electro Mechanics,Inc. part #AEM-CBL-R100A			1		
5995-985-8004		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: 2 conductors, stranded, #14 AWG, 20 ft lg o/a; Applied Electro Mechanics Inc. part #AEM-CBL20			1		
5830-227-6545		CLAMP ASSEMBLY, C: 4.250 in w 8 in h 14 in lg; Applied Electro Mechanics, Inc. part #AEM-MB1		NX	1		
5830-691-2400		CONTROL, AMPLIFIER: 28v dc 1.75 in x 2.75 in x 4.25 in o/a dim Applied Electro Mechanics, Inc. part #AEM-CON1M		NX	1		
5830-691-2399		DUMMY LOAD, ELECTRICAL: 250w nominal 2 ohms impedance; Applied Electro Mechanics, Inc. part #AEM-TE1422		NX	1		
5965-082-4009		LOUDSPEAKER ASSEMBLY: 23v 3.75 amps 500 to 5000 cps freq. response Applied Electro Mechanics, Inc. part #AEM-H92S4		NX	1		

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
		AN/UIH-5 (continued)					
5965-539-7328		MICROPHONE, DYNAMIC: 50, 150, 250, or 50,000 non impedance 100 to 7000 cps freq response; Applied Electro Mechanics, Inc. part #AEM-M1C1		NX	1		
5830-691-2393		MOUNT, LOUDSPEAKER: 5.125 in [illegible]. 7 in w, 13 in lg; Applied Electro Mechanics, Inc. par #AEM-MB2		NX	1		
5820-691-2241		RACK, ELECTRICAL EQUIPMENT: 26 in lg 18 in w 12 in h; Applied Electro Mechanics, Inc. part #AEM-P4C12		NX	1		
5965-082-4010		STAND, LOUSPEAKER: 37 in h over-all; Applied Electro Mechanics Inc. part #AEM-TP3		NX	1		
6625-965-1424		TEST SET, AUDIO: range 0 to 30 vac, 0 to 15A dc; Applied Electro Mechanics, Inc. part #AEM-PT1		NX	1		
6625-965-1425		TEST SET, AUDIO: range 0 to 30 vac, 0 to 15A dc; Applied Electro Mechanics, Inc. part #AEM-TE1421		NX	1		
		RUNNING SPARE ITEMS					
		NO PARTS AUTHORIZED FOR STOCKAGE AT OPERATORS LEVEL					

Fig. 1 —Public Address Set, AN/UIH-5 ( )

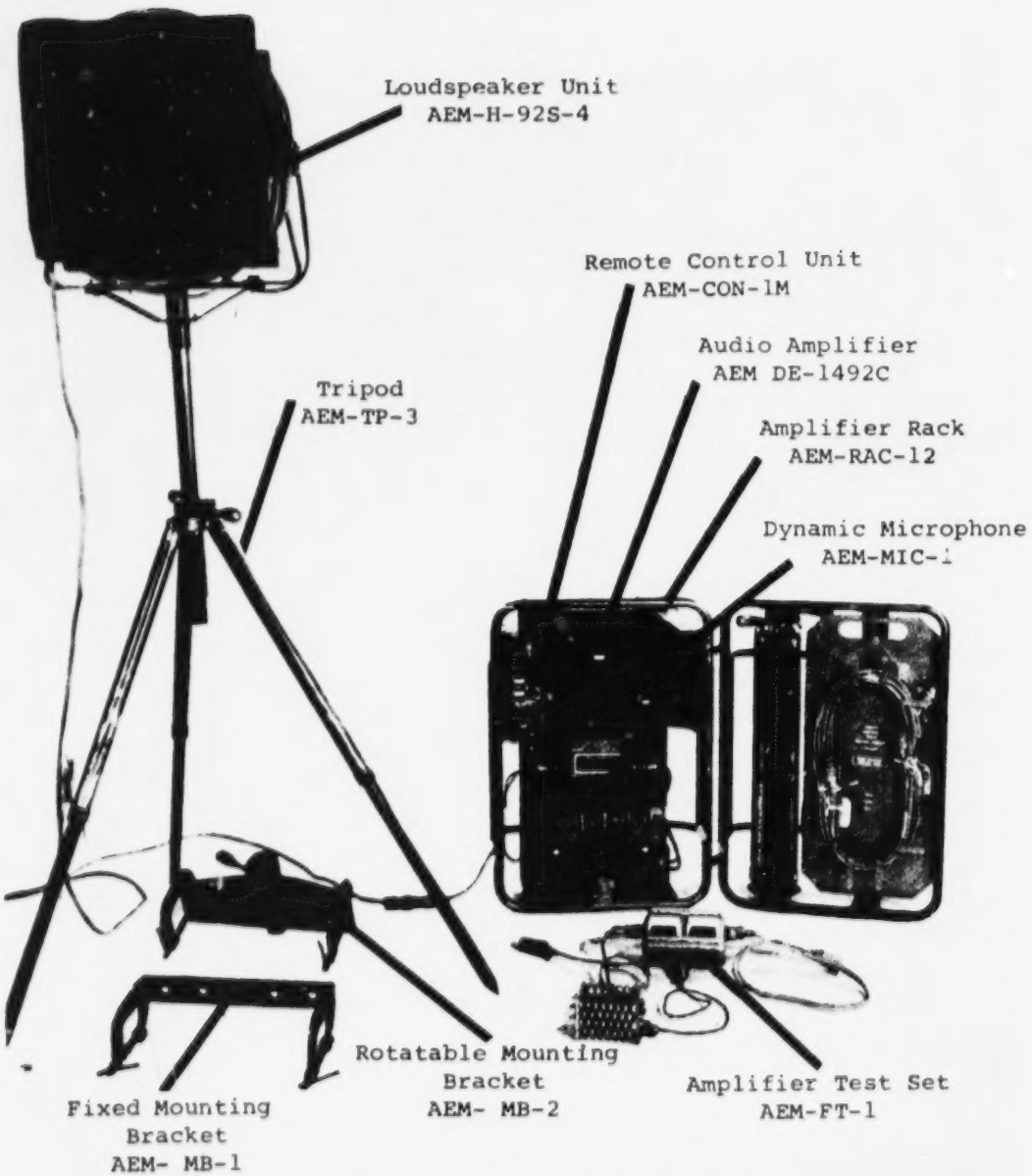


Fig. 2 — Audio Amplifier, AEM-DE-1492C

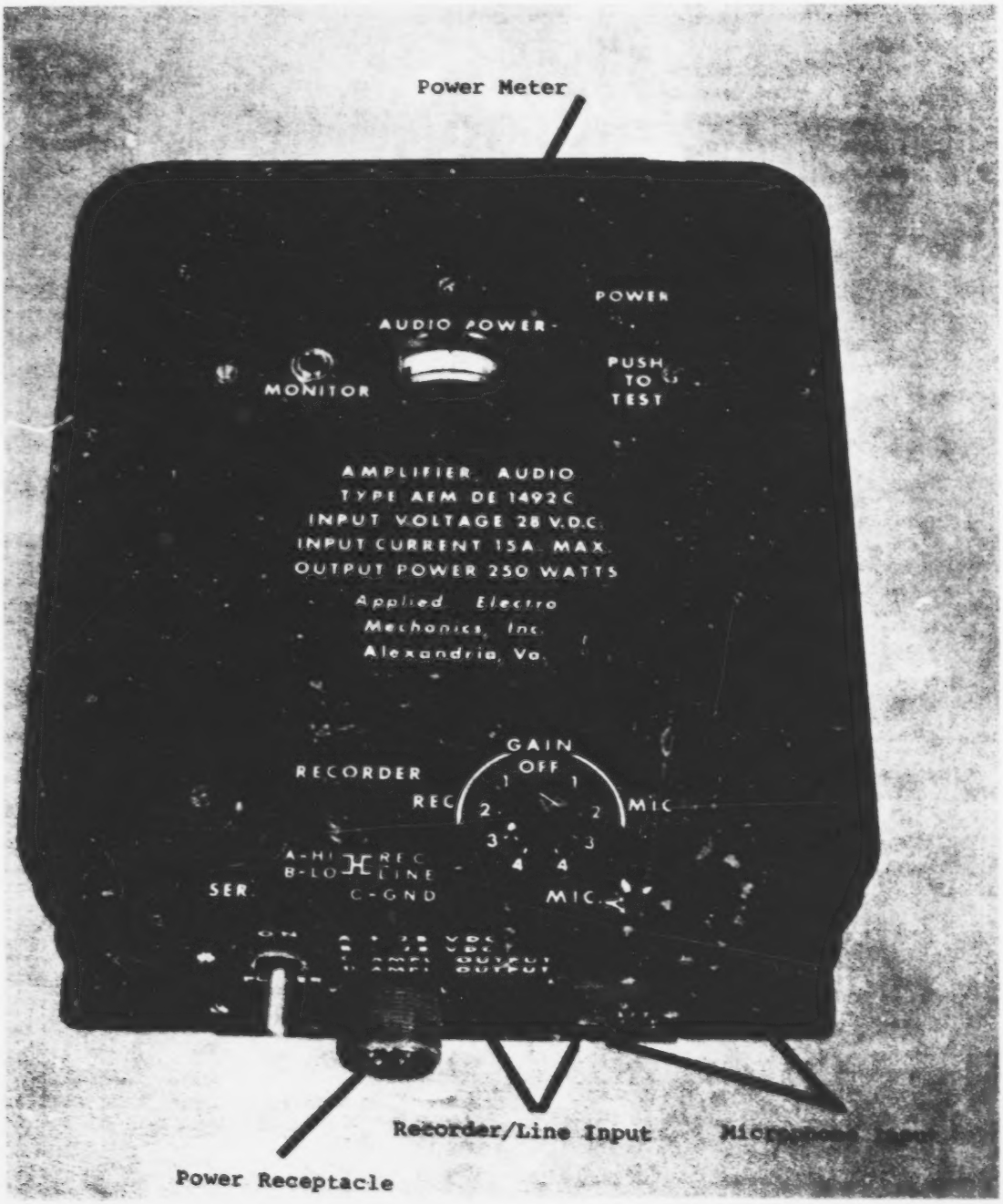


Fig. 3 — Remote Control Unit, AEM-CON-1M with Dynamic Microphone, AEM-MIC-1

Fig. 4 —Loud Speaker Unit, AEM-H-92S-4 with Tripod, AEM-TP-3
Fixed and Rotatable Mounting Brackets, AEM-MB-1 & AEM-MB-2

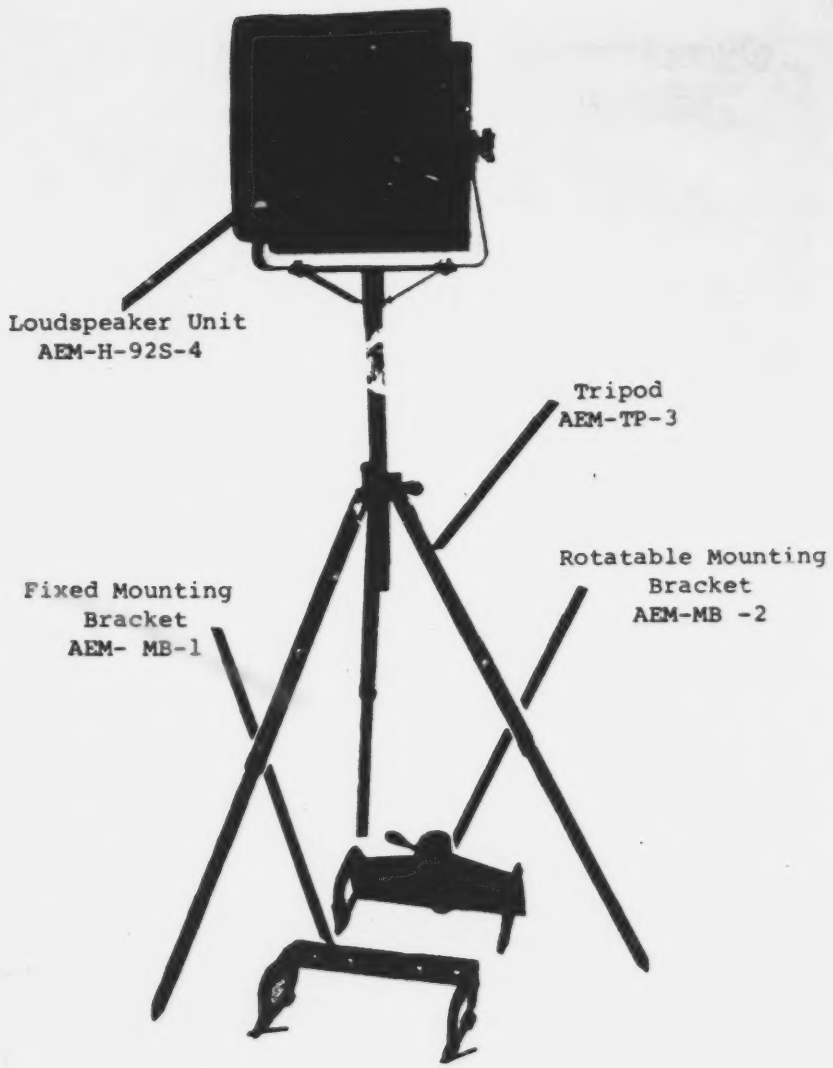


Fig. 5 —Amplifier Rack, AEM-RAC-12

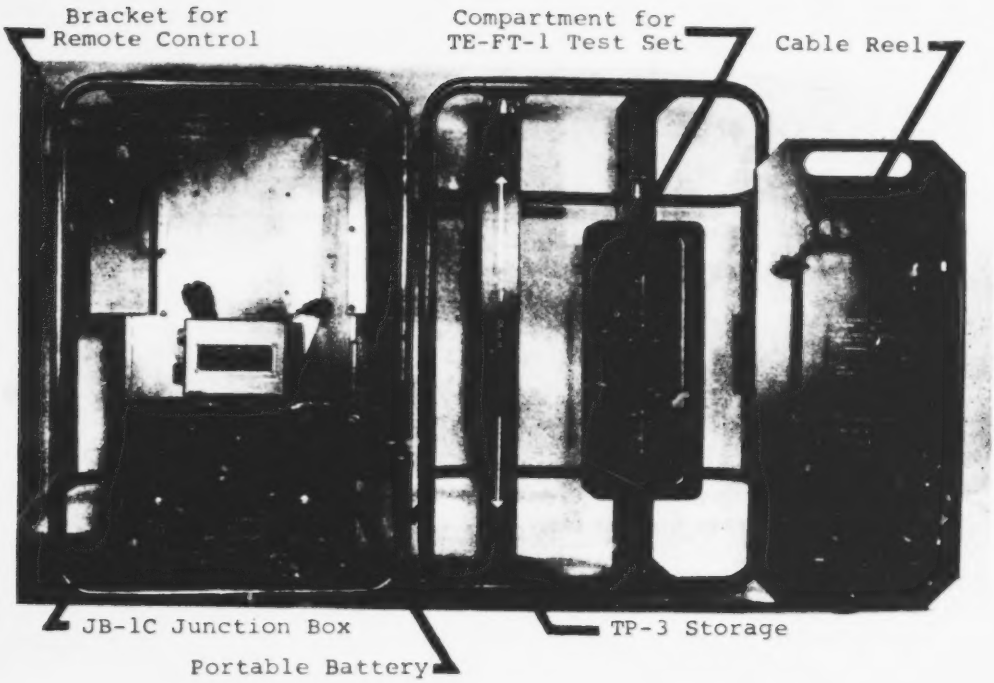


Fig. 6 —Amplifier Test Set, AEM-FT-1, Consisting of
(a) Meter Test Set, AEM-TE-1421 and
(b) Resistive Dummy Load, AEM-TE-1422

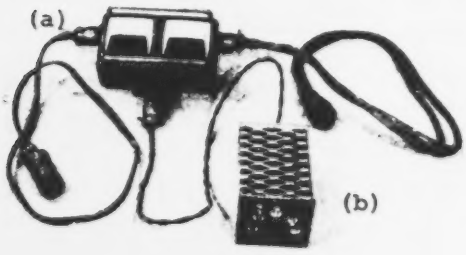


Fig. 7 —Protective Circuit Test Unit
AEM-TE-1424

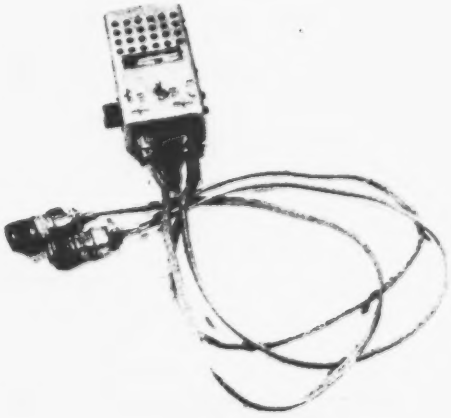


Fig. 8 — Cabling Diagram of Single System Installation, AN/UIH-5 ( ) Public Address Set

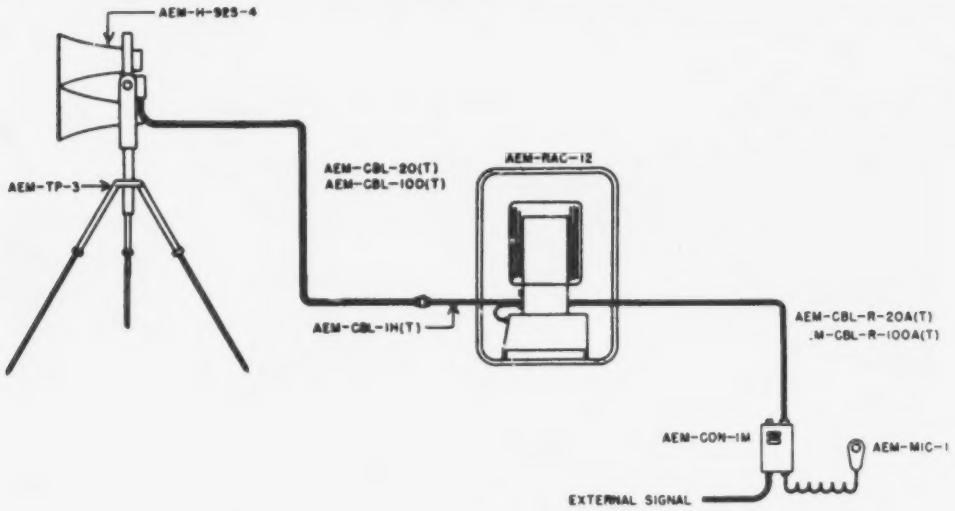
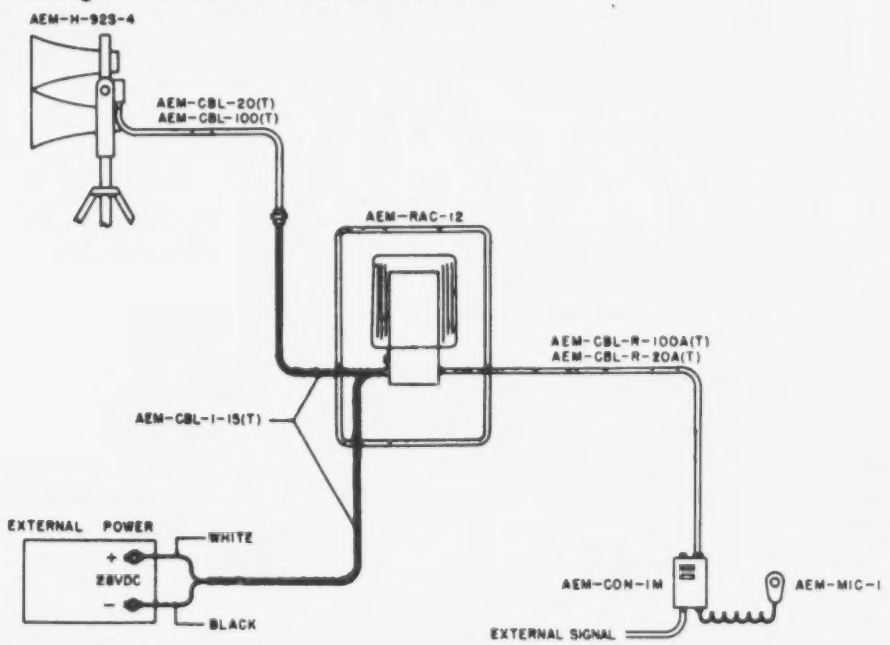


Fig. 9 — Cabling Diagram of AN/UIH-5 ( ) Public Address Set Using Power from an External Source



CAUTION: MAKE SURE POSITIVE TERMINAL OF EXTERNAL POWER SOURCE IS NOT GROUND BEFORE CONNECTING.

Fig. 10 — Wiring Diagram for Operating with Recorder or Telephone Line Inputs

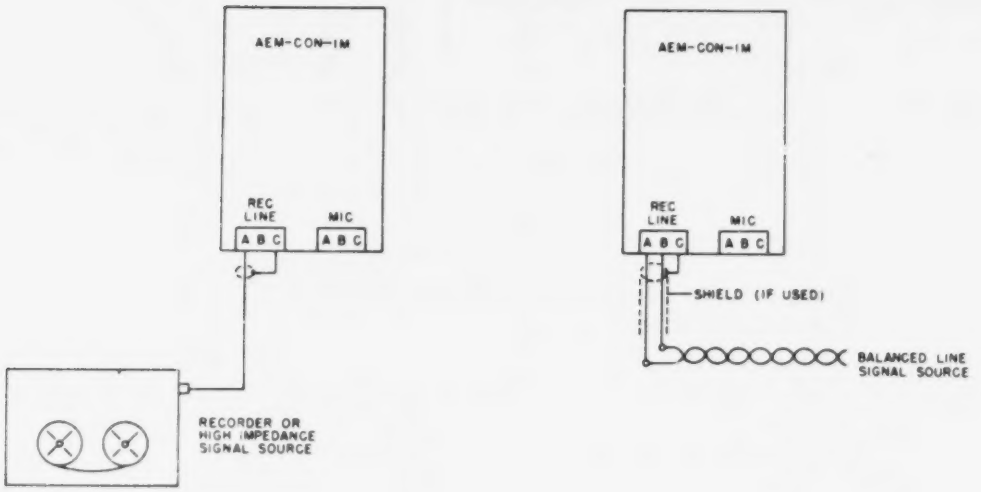


Fig. 11 — Cabling Diagram of Multiple System Installation of AN/UIH-5 ( ) Public Address/Sets

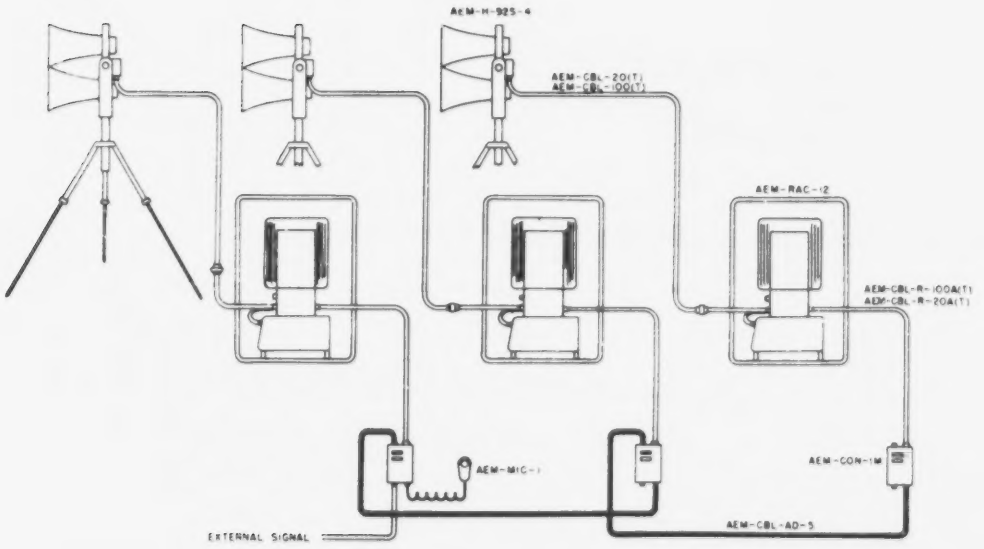


Fig. 12 — Cabling Diagram for Battery Charging, AN/UIH-5 ( ) Public Address Set

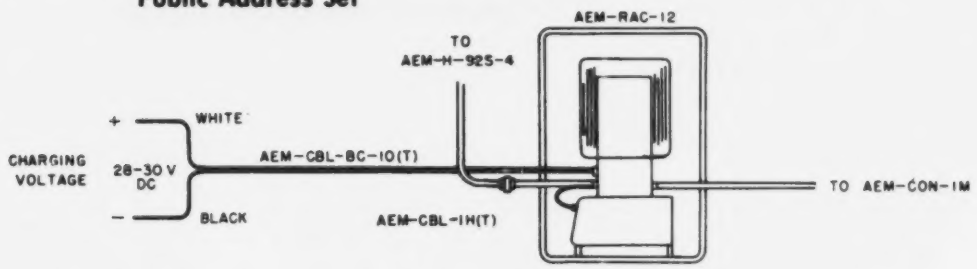


Fig. 13 — Cabling Diagram of Minimum System, AN/UIH-5 ( ) Public Address Set

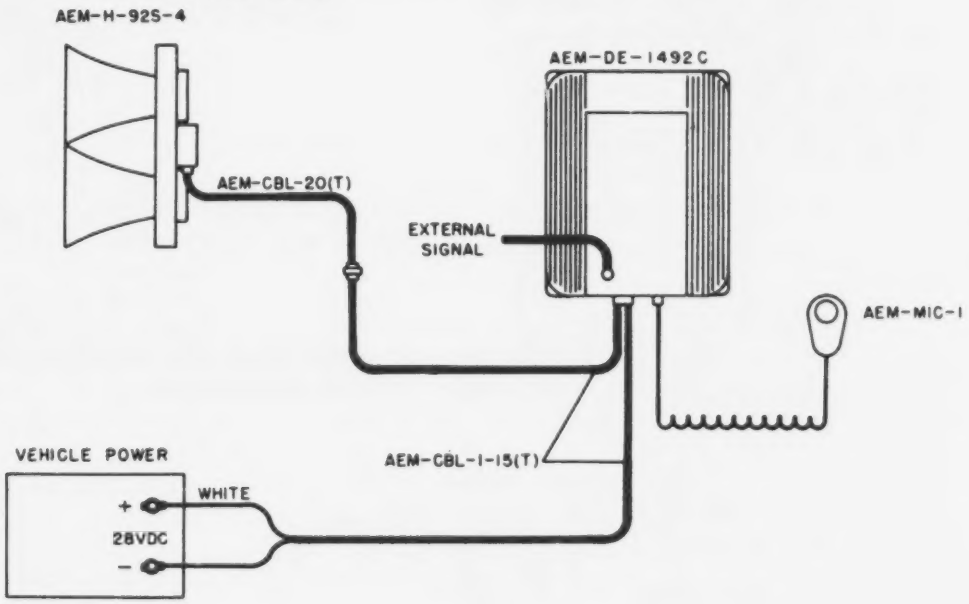


Fig. 14 — Connections for Multiple Speaker Unit Installation

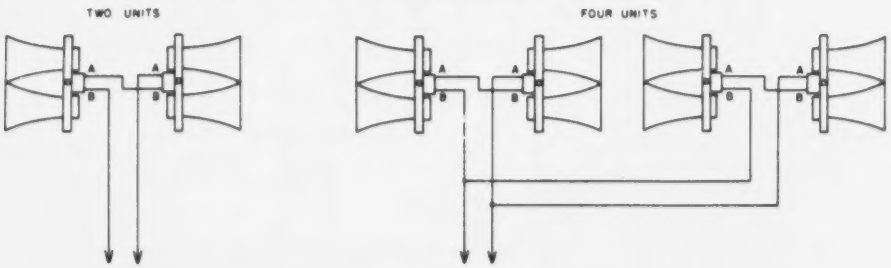


Fig. 15 — Cabling Diagram of Single System Airborne Installation, AN/UIH-5 ( ) Public Address Set

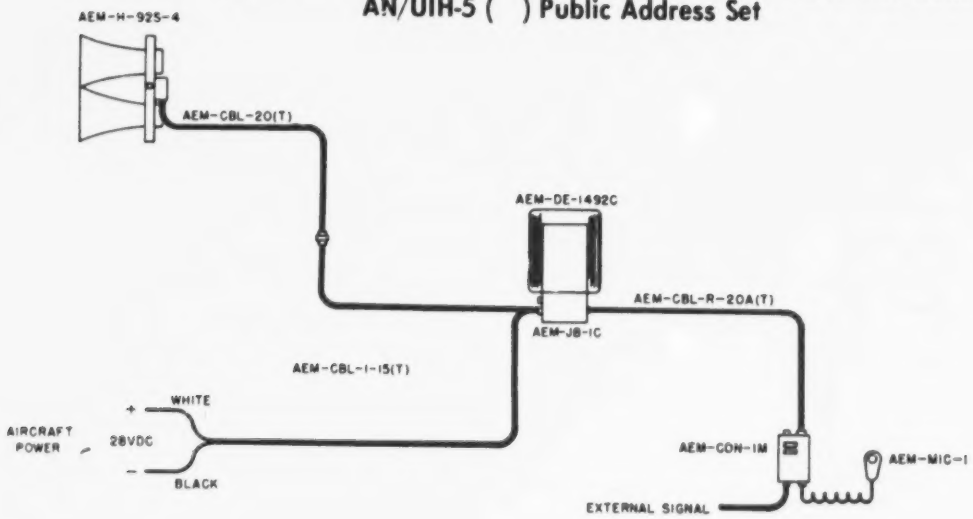


Fig. 16 — Cabling Diagram of Multiple Airborne System Installation, AN/UIH-5 ( ) Public Address Set

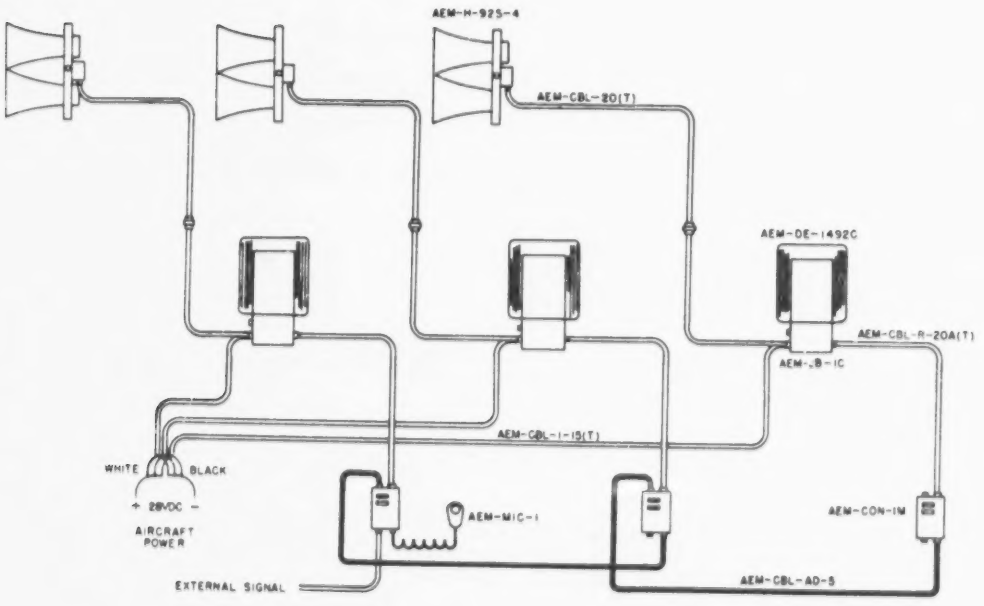


Fig. 17 — Cabling for System Check Using Test Set AEM-FT-1

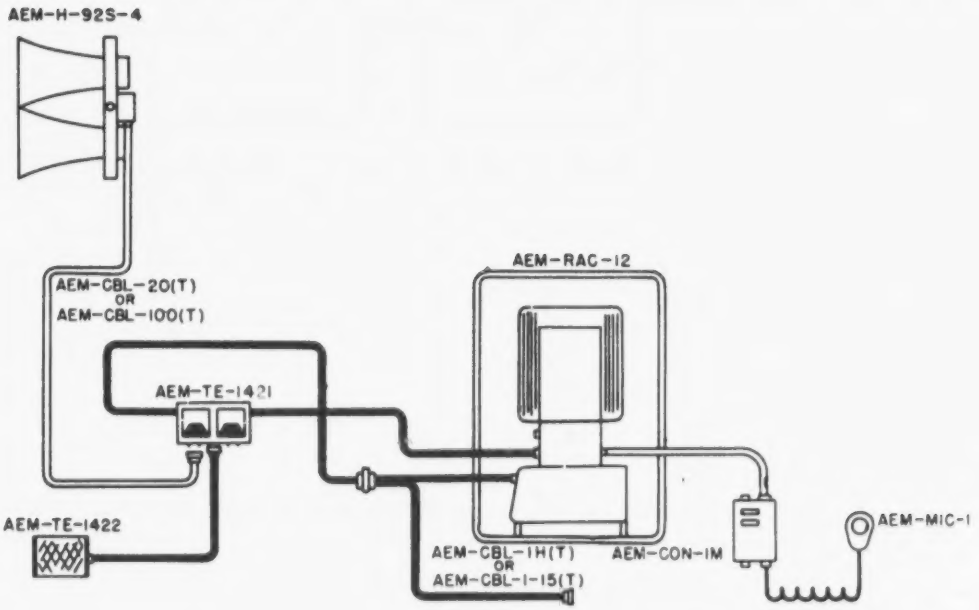


Fig. 18 — Cabling Mock Up for System Checks in Shop Maintenance

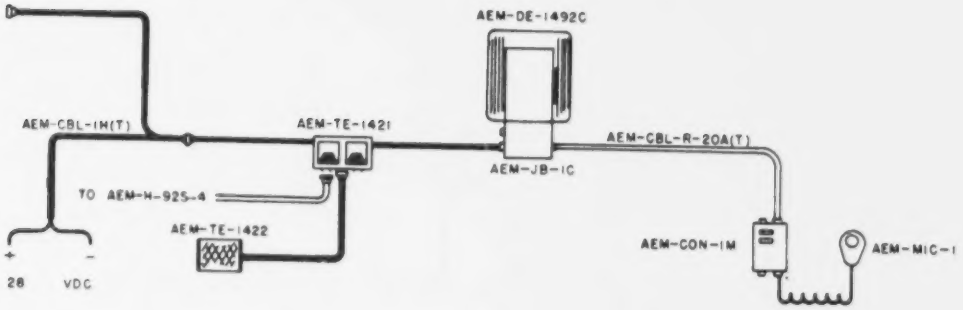


Fig. 19 — Instrumentation of AN/UIH-5 ( ) Public Address Set for Component Testing

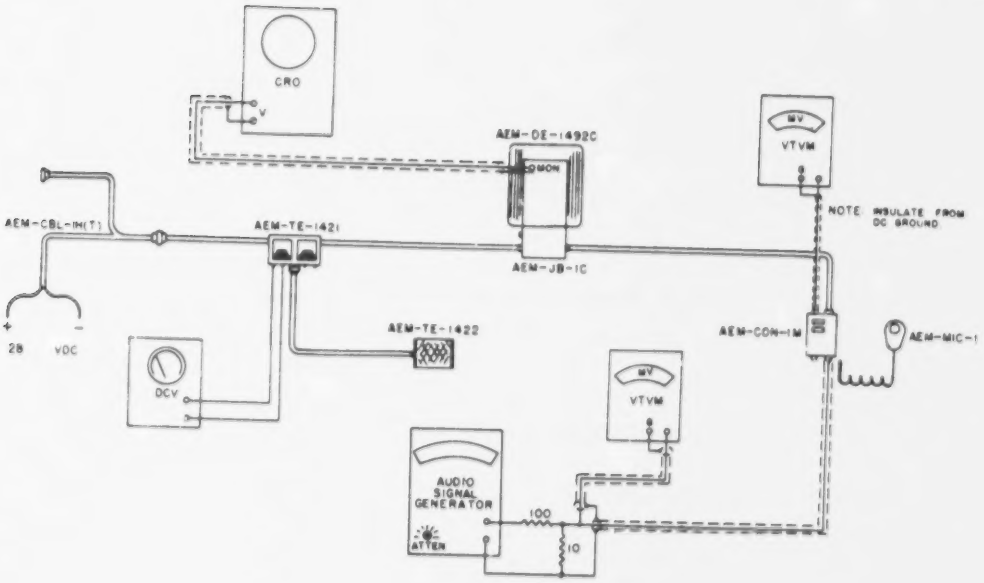


Fig. 20 — Cabling DE-1492C Amplifier for Performance Checks

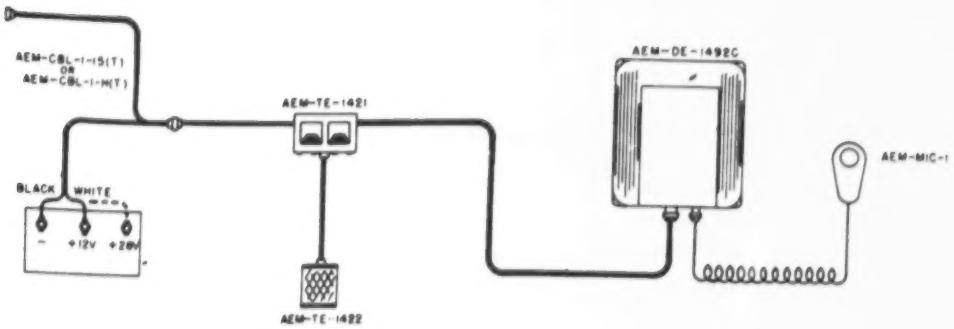


Fig. 21 — Cabling, AEM-TE-1424 Protective Circuit Test Unit

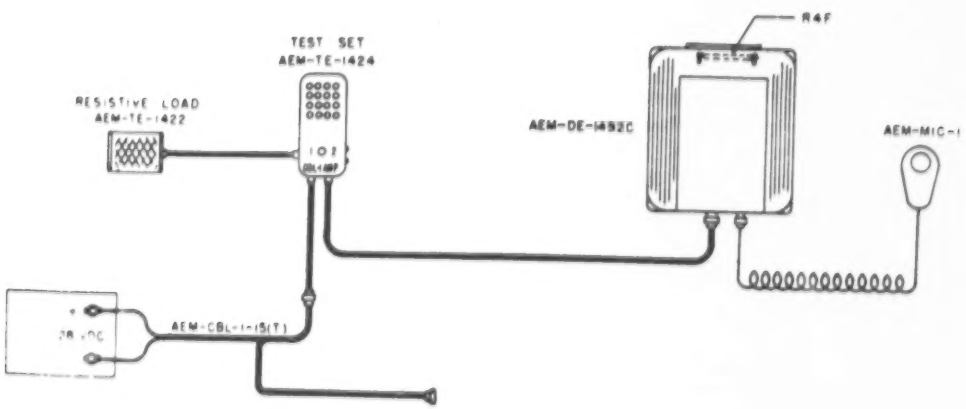
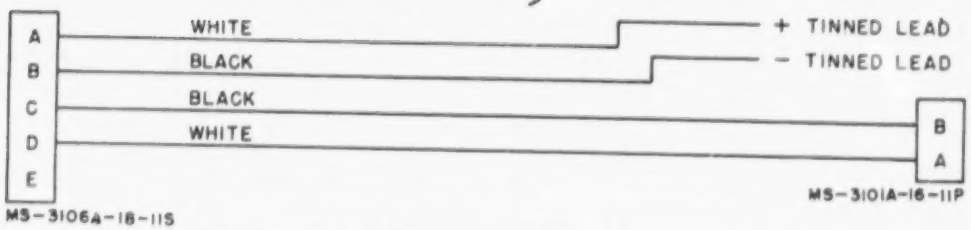
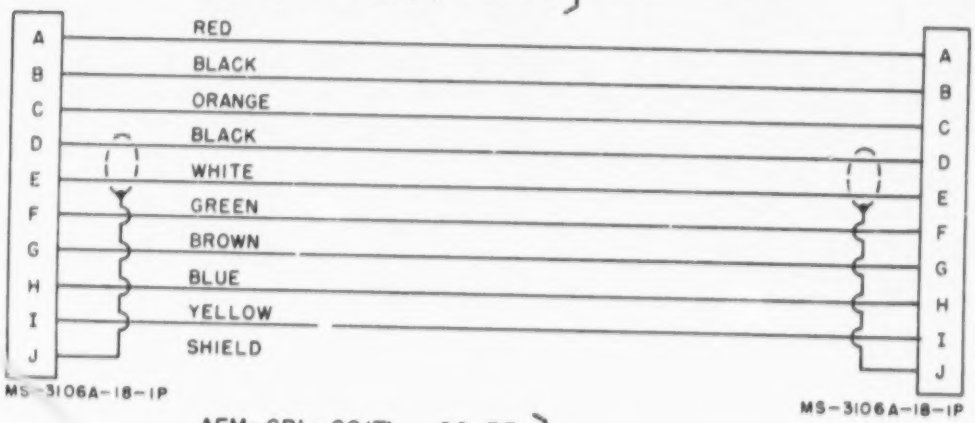


Fig. 22 — Pin Connections of Interconnecting Cables, AN/UIH-5 ( ) Public Address Set

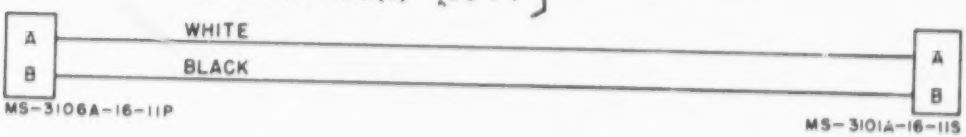
AEM-CBL-1H(T) 18 IN
AEM-CBL-1-15(T) 15 FT
} POWER CABLE



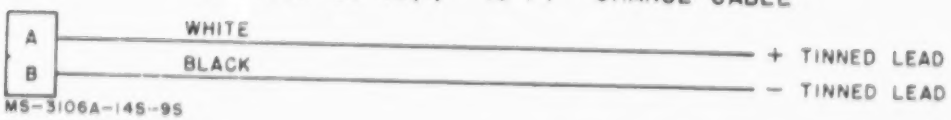
AEM-CDL-R-20A(T) 20 FT
AEM-CBL-R-100A(T) 100 FT
} REMOTE CABLE



AEM-CBL-20(T) 20 FT
AEM-CBL-100(T) 100 FT
} SPEAKER CABLE



AEM-CBL-BC-10(T) 10 FT CHARGE CABLE



AEM-CBL-AD-5 5 FT PARALLELING CABLE

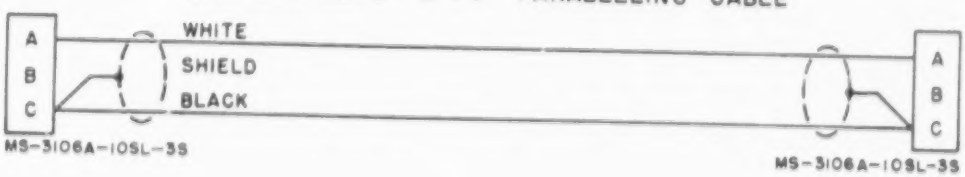


Fig. 24— Block Diagram of Protective Circuits, AEM-DE-1492C Amplifier

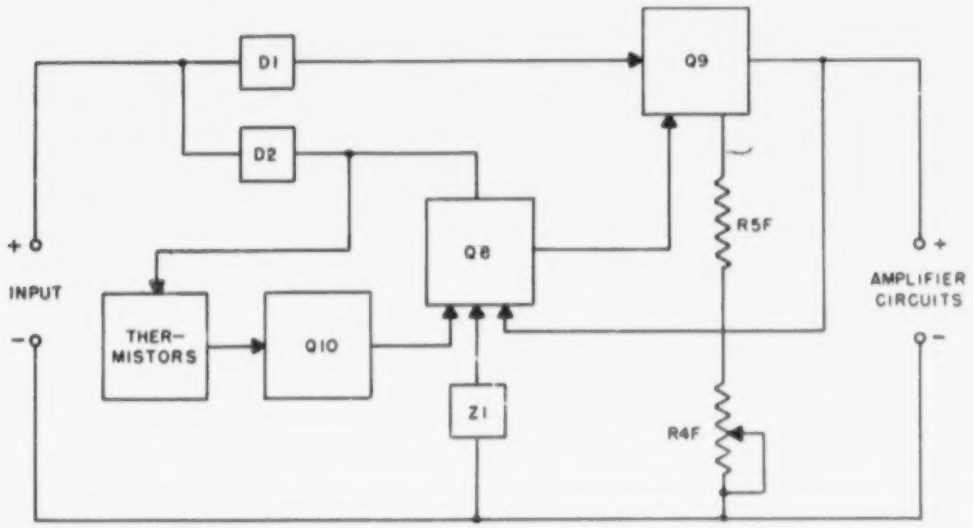


Fig. 25 — Daily Log Form for Recording Test Meter Readings and Calculations

Daily Log Form for Recording Test Meter Readings and Calculations

LOG

AN/UIH-5 ( ) SYSTEM CHECKS

Page ..... Yr .....

Co. .....

SYS. No. .....

Entry	Date	Site	Time	Ba*. Volts	WITH RESISTIVE LOAD						SPEAKER LOAD				INITIAL	Remarks
					NO SIGNAL		MAX WITH SIGNAL				MAX WITH SIGNAL					
					DCA	ACV	DCA	ACV	Pwr In	Pwr Out	DCA	ACV	Pwr In	Pwr Out		
1	5-11	K	0700	28	.8	0	12	24	336	288	12.1	23.5	339	282	RFP	All OK
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																

Fig. 26 — Trouble Shooting Chart Showing Possible System Faults with Resulting Indications

Trouble Shooting Chart Showing Possible System Faults with Resulting Indications.

Fault \ Indicator	Remote P-T-T Lamp Not Pressed	Remote P-T-T Lamp Pressed	Remote Level Meter Input	Remote Level Meter Output	Amplifier P-T-T Lamp Not Pressed	Amplifier P-T-T Lamp Pressed	Amplifier Level Meter	Monitor Jack Audio	Speaker Unit Audio	Test Meter with Dummy Load – DCA	Test Meter with Dummy Load – ACV	Test Meter with Speaker Load – DCA	Test Meter with Speaker Load – ACV
Battery Weak	Blinks	Blinks	Normal	Peaks Low	Blinks	Blinks	Peaks Low	Normal	Normal	Peaks Low	Peaks Low	Peaks Low	Peaks Low
Battery Terminals Reversed	Out	Lit	Dead	Dead	Out	Out*	Dead	Dead	Dead	0	0	0	0
Battery Dead or Power Cable Open	Out	Out	Dead	Dead	Out	Out	Dead	Dead	Dead	0	0	0	0
Battery Voltage High or Spikes on Line – Protective Circuit Tripped	Lit	Lit	OK	Dead	Out	Lit	Dead	Dead	Dead	Near 0	0	Near 0	0
Short in Speaker or Speaker Cable	Lit	Lit	OK	Dead	Out	Lit	Dead	Dead	Dead	OK	OK	0	0
Open in Speaker or Speaker Cable	Lit	Lit	OK	Max	Lit	Lit	Max	Dis-torted	Dead	OK	OK	1	Max
Shorted Transistor in DE-1492 Ampl. (Prot. Ckt. NOT Tripped)	Lit	Lit	OK	Peaks Low	Lit	Lit	Peaks Low	Dis-torted	Dis-torted	Hi with no signal	Peaks Low	Hi with no signal	Peaks Low
Audio Feedback with Mic Open – No Speech	Lit	Lit	Off 0	Off 0	Lit	Lit	Off 0	Tone	Tone	OK	OK	Hi	Off 0
Electrical Feedback – Ground Loop thru Input – Open Lead – Electrical Coupling Input to Output	Lit	Lit	OK or Off 0	Off 0	Lit	Lit	Off 0	Tone or Noise	Tone or Noise	Hi	Off 0	Hi	Off 0

*Will light if operating with NO Remote Control Unit.

Fig. 27 — Location of Replaceable Parts, AEM-DE-1492C Audio Amplifier

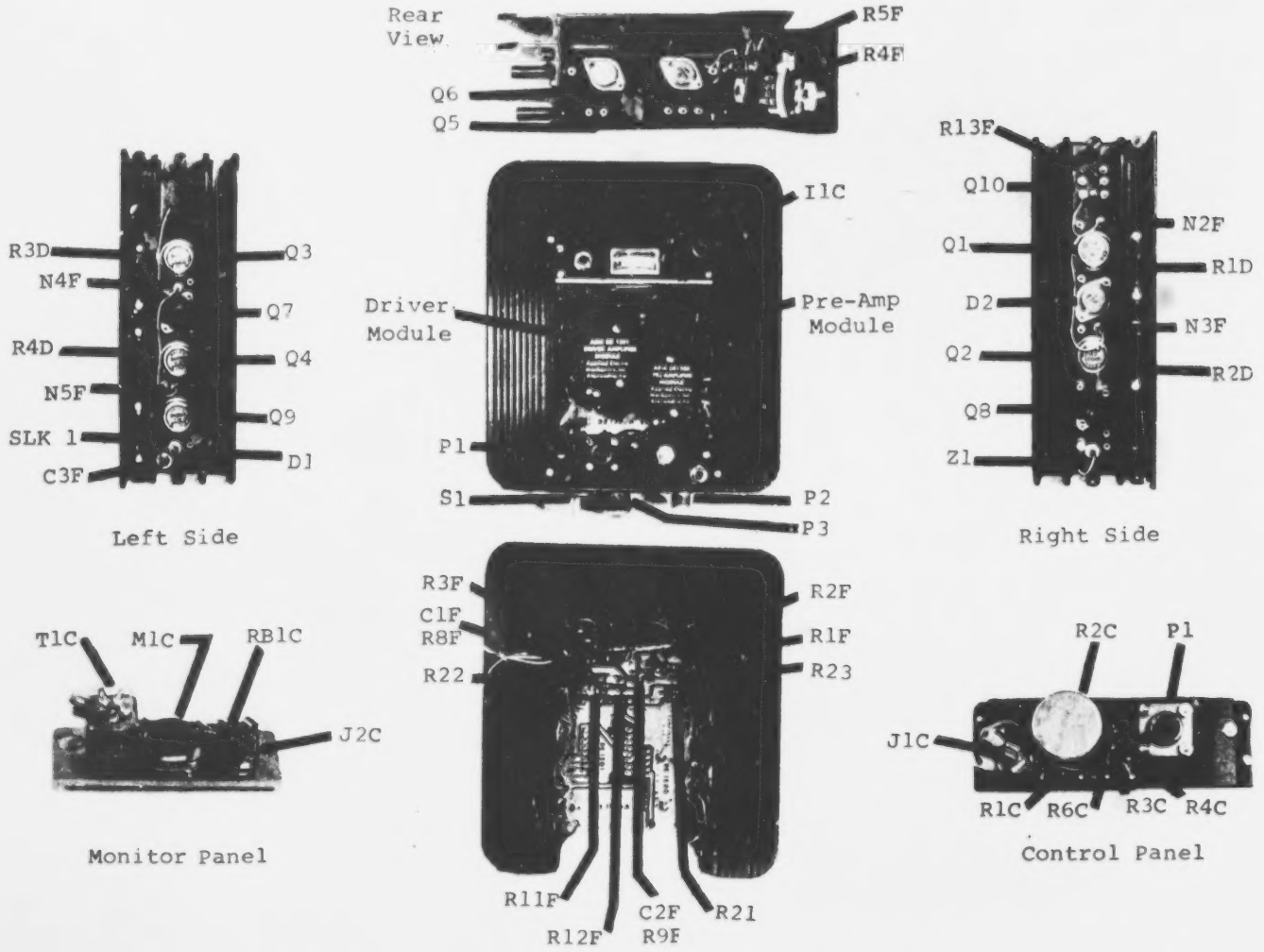


Fig. 28 — Location of Replaceable Parts, AEM-CON-1M Remote Control Unit

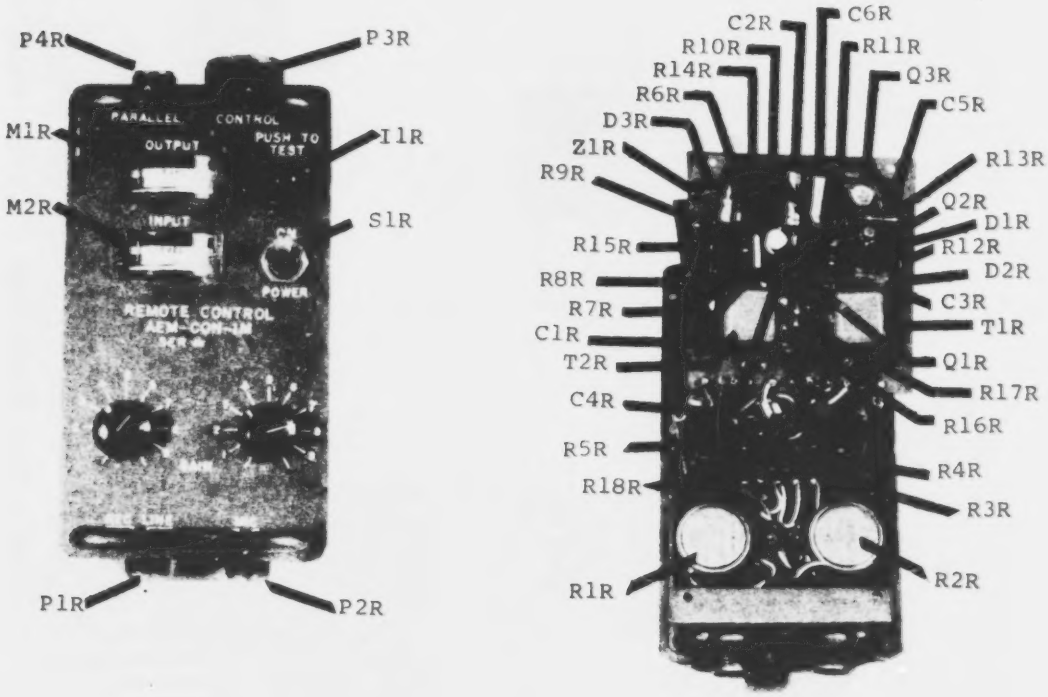


Fig. 29 — Location of Replaceable Parts, AEM-JB-1C Junction Box

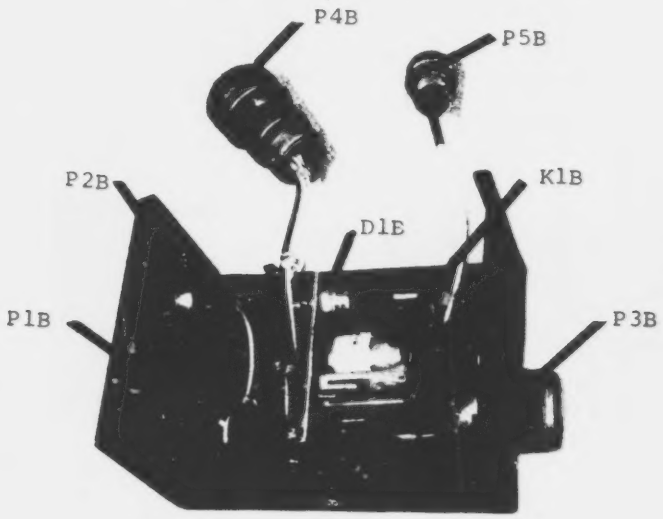


Fig. 30 — Test Points on Chassis, AEM-DE-1492C Audio Amplifier

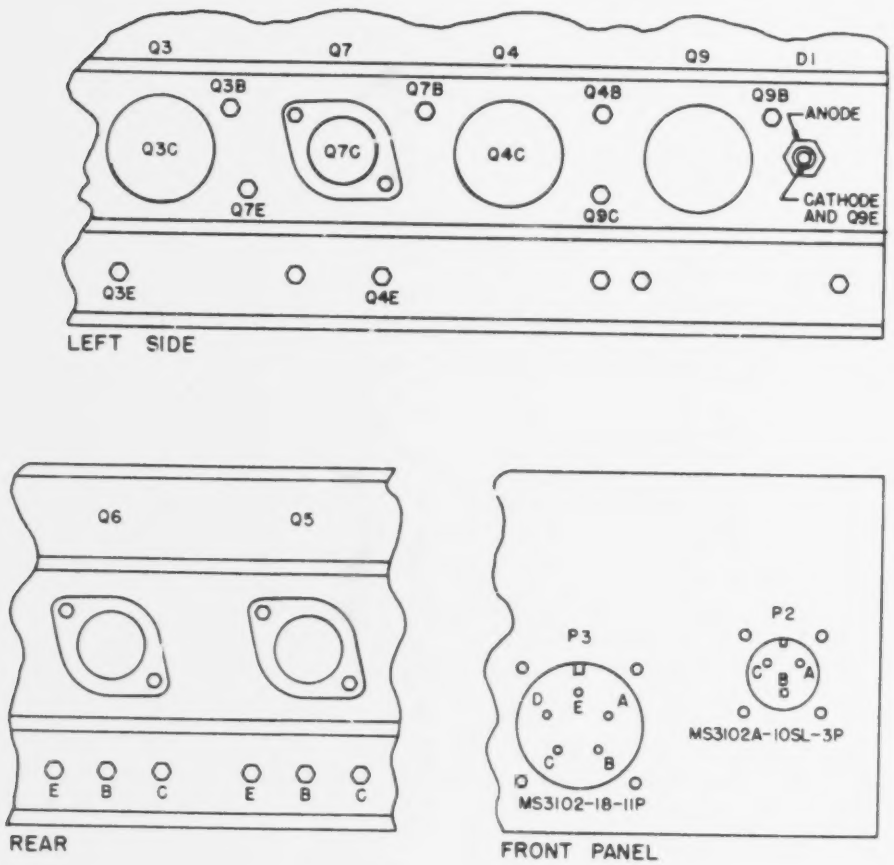


Fig. 31 — Resistance Measurements between Terminals of Semi-Conductor Devices, AEM-DE-1492C Amplifier

Resistance Measurements between Terminals of All Removable Semi-conductors in DE-1492 C Amplifier. Measurements Made with 20,000 Ohms-per-volt Meter on RX1 Scale Except As Noted. Polarity Marks Denote the Positive (Red) or Negative (Black) Test-meter Lead to Each Terminal. Modules M1 and M2 in Place.

Part #	E +	B −	B +	E −	E +	C −	C +	E −	B +	C −	C +	B −	C, Cat. +	Gnd −	Gnd +	C, Cat. −	An. +	Cat −	Cat +	An −
Q1, Q2	5		12		50		4		70		5		0		0		–		–	
Q3, Q4	5		12		50		4		70		5		50		4		–		–	
Q5, Q6	5		80		25		14		150		5		14		18		–		–	
Q7	5		4K (x 10)		50		150		4K (x 10)		5		12		12		–		–	
Q8	5		160		200		18		500		5		100		12		–		–	
Q9	5		4K (x 10)		4		1.4K (x 10)		100		5		50		6		–		–	
Q10	700 (x 10)		15		200		500		20		700 (x 10)		500		20		–		–	
D1	–		–		–		–		–		–		50		2K (x 10)		15		High	
D2	–		–		–		–		–		–		250		50		20		High	
Z1	–		–		–		–		–		–		1000		15		15		1000	

Fig. 32 — Resistance Measurements between Pins on Power Plug for Fault Location on AEM-DE-1492C Amplifier

Resistance between Pins on Power Plug, P3, of DE-1492-C Amplifier using 20,000 Ohms-Per-Volt Meter on R x 1 Scale. Modules M1 and M2 in Place. Additional Columns Show Effect on Readings Due to Certain Faults. "N" Means No Resistance Change from Normal.

P3 – Pin Nos.																
+ (Red) Lead	– (Black) Lead	No Fault	Q1 E-C Short	Q2 E-C Short	Q3 E-C Short	Q4 E-C Short	Q3 C-Chassis Short	Q4 C-Chassis Short	Q8 C-Chassis Short	D1 An-Cath Short	D1 An-Chassis Short	D2 An-Cath Short	D2 AN-Chassis Short	C3F Short	SLK-1 Open	T-161 Pri. Short
A	B	100	N	N	N	N	N	N	25	50	0	N	0	15	High	N
B	A	High	N	N	N		N	N	N	N	0	50	0	N	N	N
A	C	100	N	N	35	75	N	N	35	50	5	N	5	15	High	N
C	A	High	N	N	N	N	N	N	N	N	50	50	50	N	N	N
A	D	100	N	N	75	35	N	N	35	50	5	N	5	15	High	N
D	A	High	N	N	N	N	N	N	N	N	50	50	50	N	N	N
C	B	50	0	35	N	N	0	35	4	N	N	N	N	N	N	N
B	C	4	0	N	N	N	0	N	N	N	N	N	N	N	N	N
D	B	50	35	0	N	N	35	0	N	N	N	N	N	N	N	N
B	D	4	N	0	N	N	N	0	N	N	N	N	N	N	N	N
E	B	12	N	N	N	N	N	N	N	N	N	N	N	N	N	0

Fig. 33 — D. C. Voltages from Test Points to Chassis with Reduced and Normal Supply Voltages

D. C. Voltages from Test Points to Chassis with Reduced and Normal Supply Voltages.

TEST POINT	SUPPLY VOLTS		TEST POINT	SUPPLY VOLTS	
	12	28		12	28
Q3-E	11.0	27.0	Q6-E	11.0	27.0
Q3-B	11.0	27.0	Q6-B	11.0	27.0
Q3-C	5.5	13.5	Q6-C	0.2	0.5
Q7-E	5.5	14.5	Z1-Cath	11.0	28.0
Q7-B	5.0	14.0	Q8-E	12.0	28.0
Q7-C	0.2	0.5	Q8-B	11.5	28.0
Q4-E	11.0	27.0	Q8-C	11.0	27.0
Q4-B	11.0	27.0	Q2-E	5.5	13.5
Q4-C	5.5	13.5	Q2-B	5.5	13.5
Q9-E	11.5	27.5	Q2-C	0.0	0.0
Q9-B	11.0	27.0	D2-Anode	12.0	27.0
Q9-C	11.0	27.0	Q1-E	5.5	13.5
D1-Anode	12.0	28.0	Q1-B	5.5	13.5
Q5-E	11.0	27.0	Q1-C	0.0	0.0
Q5-B	11.0	27.0	Q10-E	11.0	26.0
Q5-C	0.2	0.5	Q10-B	10.5	25.5
			Q10-C	11.5	28.0

Fig. 34 — Basing Diagrams for Transistors Used in AN/UIH-5 ( ) Public Address Set

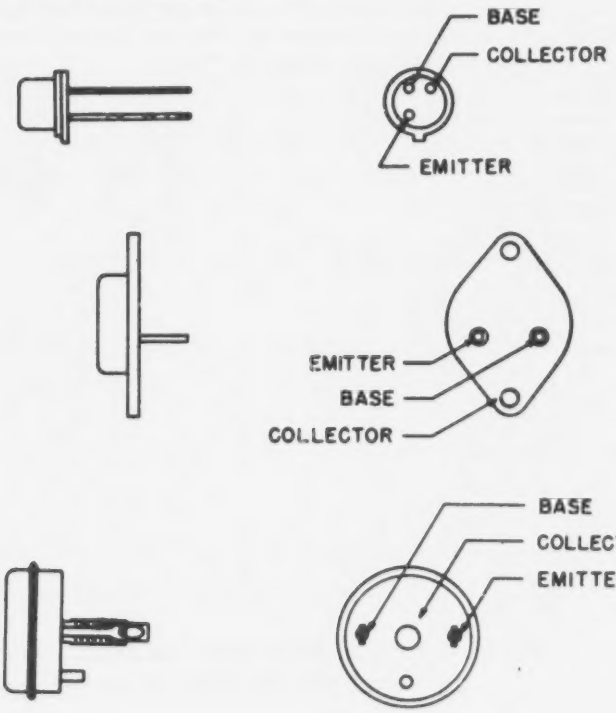
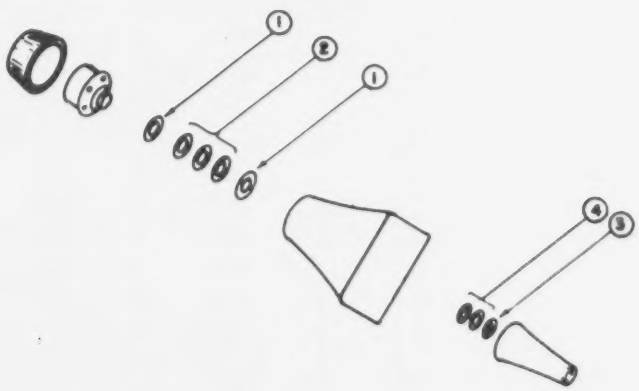


Fig. 35 — Details of Speaker Driver Mounting



ITEM NO.	DESCRIPTION	QUAN. PER ASSY.
1.	STEEL WASHER $1\frac{7}{8}$ X $1\frac{3}{8}$ PP-1126	2
2.	VELLUTEX WASHER $1\frac{7}{8}$ X $1\frac{3}{8}$ PP-1130	3
3.	RUBBER WASHER $1\frac{5}{16}$ X $\frac{3}{4}$ PP-1131	1
4.	VELLUTEX WASHER $1\frac{5}{16}$ X $\frac{3}{4}$ PP-1140	2

Fig. 36 — List of Units and Cables of the AN/UIH-5 ( ) Public Address Set

List of Units and Cables of the AN/UIH-5( ) Public Address Set

NAME of UNIT	DESIGNATION	DIMENSIONS	WEIGHT POUNDS	STOWAGE LOCATION
Audio Amplifier	AEM-DE-1492C	8⅜ x 9¼ x 3¾ in.	10.0	Rack
Remote Control	AEM-CON-1M	3½ x 3½ x 7 in.	1.5	Rack
Dynamic Microphone	AEM-MIC-1	Hand Size with Cable	1.0	Rack
Amplifier Rack	AEM-RAC-12	18 x 13½ x 26 in.	17.9	Rack
Battery-NI-CAD	AEM-BAT-1	4½ x 4⅝ x 11 in.	14.6	Rack
Loud Speaker	AEM-H-925-4	17½ x 19 x 12 in.	26.0	Speaker
Tripod	AEM-TP-3	3½ x 4 x 24½ in.	4.6	Rack
Fixed Mounting Bracket	AEM-MB-1	7½ x 4¼ x 14 in.	4.9	Supply
Rotatable Mounting Bracket	AEM-MB-2	7½ x 7½ x 14 in.	5.4	Supply
Meter Test Set	AEM-TE-1421	3⅛ x 3¼ x 6 in. with 2-3-ft. cables	2.3	Rack
Resistive Dummy Load	AEM-TE-1422	3⅛ sq. x 6 in. with 3-ft. cable	1.6	Rack
Protective Circuit Test Unit	AEM-TE-1424	3 x 4 x 6 in.	1.5	Supply
Power Cable, 15 ft.	AEM-CBL-1-15 (T)	15 feet	1.3	Rack
Power Cable, 18 in.	AEM-CBL-1H (T)	18 in.	0.43	Rack
Speaker Cable, 100 ft.	AEM-CBL-100 (T)	100 feet	3.5	Speaker
Speaker Cable, 20 ft.	AEM-CBL-20 (T)	20 feet	0.92	Speaker
Remote Cable, 100 ft.	AEM-CBL-R-100A(T)	100 feet	5.3	Rack
Remote Cable, 20 ft.	AEM-CBL-R-20A(T)	20 feet	1.3	Rack
Paralleling Cable	AEM-CBL-AD5	5 feet	0.2	Rack
Charging Cable	AEM-CBL-BC-10(T)	10 feet	0.5	Rack

Fig. 37 — Replaceable Parts, AN/UIH-5 ( ) Public Address Set

Replaceable Parts, AN/UIH-5 ( ) Public Address Set

AMPLIFIER, AEM-DE-1492C

Reference Symbol	Description	Manufacturer and Part No.	Reference Symbol	Description	Manufacturer and Part No.
C1F, C2F	Capacitor, 1000 pf.	Aerovox Type Hi-Q Ceramic	R6C	Resistor, 27 ohm ½ W	Ohmite RC 20 or equal
C3F	Capacitor, 1000 pf.	Sprague 514 C 1	R1D, R2D	Resistor, .03 ohm, 3 W	AEM-RO-3A
D1	Diode	Trans-sil MS1420 or equal	R3D, R4D		
D2	Diode	Texas Instrument 2N458A or equal	R1F	Resistor, .33 ohm 2 W	IRC Wirewound or equal
I1	Lamp Assbly - Press-to-test	Dialight VM910M66 with: 91052-M66 Lens, G.E. 327 Lamp	R2F	Resistor 150 ohm ½ W	Ohmite RC 20 or equal
			R3F	Resistor 1.8 K ohm 2 W	Ohmite RC 42 or equal
J1C	Jack, Microphone	Type JJ 033	R4F	Resistor, 90 ohm adj. 40W	Ohmite 51522 or equal
J2C	Jack, Headphone	Type JJ 034	R5F	Resistor, 10 ohm 10 W	Ohmite F105 or equal
M1C	Meter, 0-1 MADC	AEM-M-101			
Mod. 1	Module, Preamplifier	AEM-DE-1500	R7F	Resistor, 200 ohm ½ W	Ohmite RC 20 or equal
Mod 2	Module, Driver	AEM-DE-1501	R8F, R9F	Resistor, .2 K ohm ½ W	Ohmite RC 20 or equal
N2F, N3F) N4F, N5F)	Thermistor, 5000 ohm	AEM-1521-A-5K	R10F	Resistor, 220 ohm ½ W	Ohmite RC 20 or equal
			R11F	Resistor, 300 ohm 3 W	Ohmite 4404X or equal
P1, P2	Receptacle	MS3102A-10SL-3P	R12F	Resistor, 150 ohm, 3 W	Ohmite 4396X or equal
P3	Receptacle	MS3102A-18-11P	R13F	Resistor, 270 ohm ½ W	Ohmite RC 20 or equal
Q1, Q2, Q3, Q4, Q9)	Transistor, PNP	Delco 2N1523 or Motorola 2N2158A	R14F	Resistor, 820 ohm ½ W	Ohmite RC 20 or equal
			R21	Resistor, 68 ohm ½ W	Ohmite RC 20 or equal
Q5, Q6	Transistor, PNP	Texas Instrument 2N458A or equal	R22, R23	Resistor, 8.2 ohm 1 W	Ohmite RC 32 or equal
Q7, Q8	Transistor, PNP	Motorola 2N2145A or equal	RB-1C	Rectifier Bridge	AEM-DE-1538A
Q10	Transistor, NPN	Motorola 2N708 or equal	S1	Switch, SPST	Micro SW MS 24523-22 or equal
R1C, R4C	Resistor, 1.8 K ohm ½ W	Ohmite RC 20 or equal	SL-1	Safety Link	AEM-SLK-1
R2C	Potentiometer, 250 ohm CT	Allen Bradley JA1NO48P251CA	T1C	Transformer, Audio	AEM-T-161
R3C	Resistor, 820 ohm ½ W	Ohmite RC 20 or equal	Z1	Zener Diode	Motorola IN2990A-IN2991A

JUNCTION BOX, AEM-JB-1C

Reference Symbol	Description	Manufacturer and Part No.	Reference Symbol	Description	Manufacturer and Part No.
D1B	Diode	Trans-sil MS1420 or equal	P2B	Receptacle	MS3102A-14S-9P
D2B, D3B	Diode	Texas Instrument TI 51	P3B	Receptacle	MS3102A-18-1S
K1B	Relay, SPST, 24 VDC	Potter Brumfield MB3D	P4B	Connector	MS3106A-18-11S
RB1B	Rectifier Bridge	AEM-DE-1538B	P5B	Connector	MS3106A-10SL-3S
P1B	Receptacle	MS3102A-18-11P			

REMOTE CONTROL, AEM-CON-1M

Reference Symbol	Description	Manufacturer and Part No.	Reference Symbol	Description	Manufacturer and Part No.
C1R, C5R	Capacitor 4.7 mfd. 35V	Sprague 150D475X0035B2 or equal	R4R, R5R	Resistor 270 ohm ½ W	Ohmite RC 20 or equal
C2R	Capacitor 47 mfd 35V	Sprague 150D476X035S2 or equal	R6R	Resistor, 2.2 K ohm ½ W	Ohmite RC 20 or equal
C3R	Capacitor .047 mfd 200V	Sprague 192P47392 or equal	R7R, R11R	Resistor, 2.7 K ohm ½ W	Ohmite RC 20 or equal
C4R	Capacitor .001 mfd, Disk	Sprague 5GA-D10 or equal	R8R	Resistor, 1.2 K ohm ½ W	Ohmite RC 20 or equal
C6R	Capacitor 22 mfd 35V	Sprague 150D226X0035R2 or equal	R9R	Resistor, 1 K ohm ½ W	Ohmite RC 20 or equal
D1R, D2R, D3R	Diode	Texas Instrument TI 51	R10R	Resistor, 82 K ohm ½ W	Ohmite RC 20 or equal
I1R	Lamp Assbly - Press-to-test	Daylight VM910M66 with 91052-M66 Lens and G.E. 327 Lamp	R12R, R13R	Resistor, 470 ohm ½ W	Ohmite RC 20 or equal
			R14R	Resistor, 330 ohm ½ W	Ohmite RC 20 or equal
M1R, M2R	Meter, 0-1 MADC	AEM-M-101	R15R	Resistor, 1 K ohm, 2 W	Ohmite RC 42 or equal
P1R, P2R, P4R	Receptacle	MS3102A-10SL-3P	R16R	Resistor, 56 ohm ½ W	Ohmite RC 20 or equal
P3R	Receptacle	MS3102A-18-1S	R17R	Resistor, 47 ohm ½ W	Ohmite RC 20 or equal
Q1R, Q3R	Transistor, PNP	Motorola 2N652A	R18R	Resistor, 1.8 K ohm ½ W	Ohmite RC 20 or equal
Q2R	Transistor, NPN	Motorola 2N708	S1R	Switch, SPST	Micro Sw MS24523-22 or equal
R1R, R2R	Potentiometer 500 ohm	Allen-Bradley JA1N048P-501AA or equal	T1R	Transformer	AEM-T-217
			T2R	Transformer	AEM-T-218
R3R	Resistor 27 ohm ½ W	Ohmite RC 20 or equal	Z1R	Zener Diode	Motorola IN3016B

Fig. 37 (cont)

SPEAKER UNIT, AEM-H-92S-4

Part Number	Description
SA-222	Driver with Voice Coil and Heat Sink
D-20P	Voice Coil, 8 ohm with instructions and wiper
10-TE-013	Terminal Board Assembly (Symbol, TB-1)
JB-1A	Junction Box with 5105-16-11P Connector

Fig. 38 — Schematic Diagram, AEM-DE-1492C Audio Amplifier

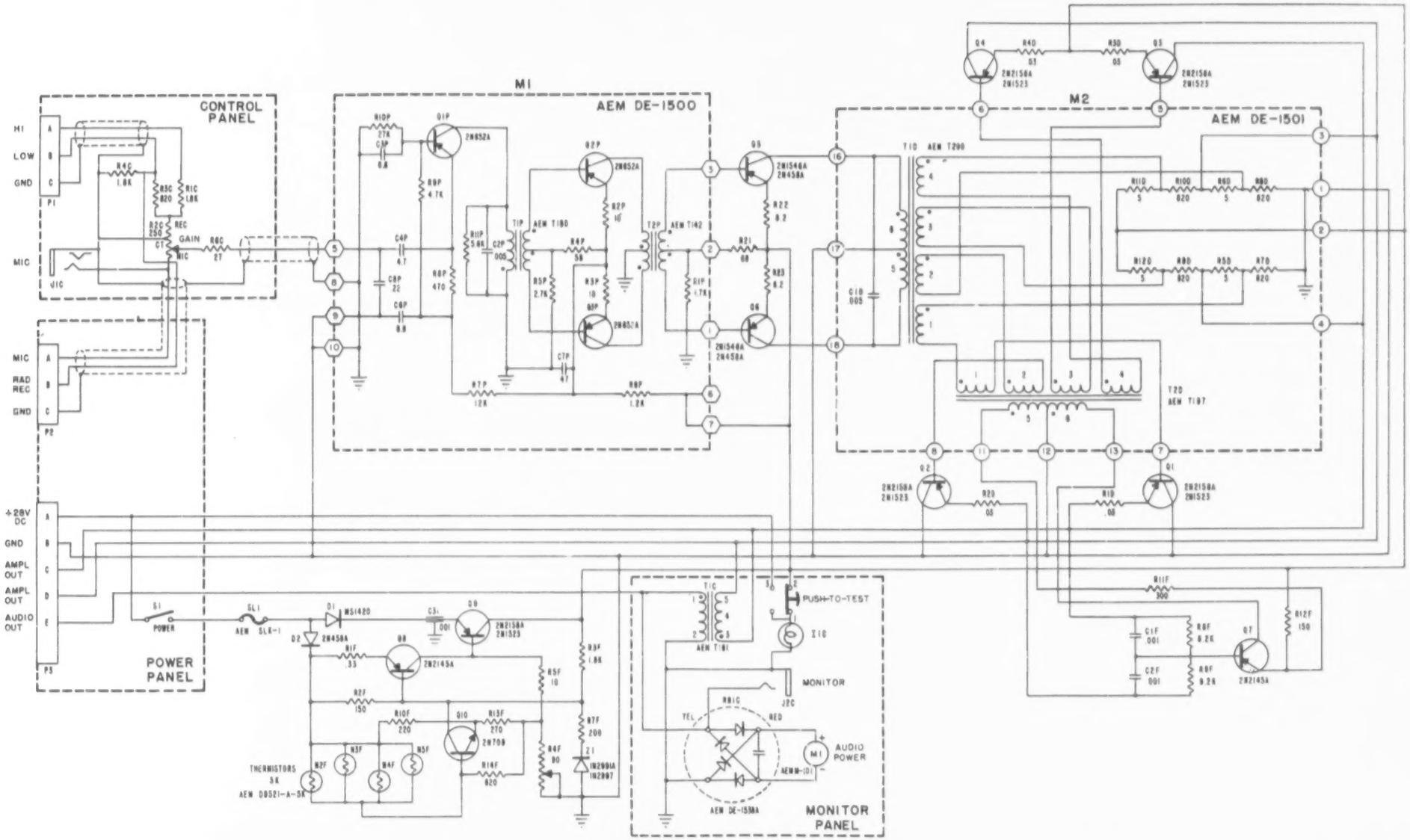


Fig. 39 — Schematic Diagram, AEM-CON-1M Remote Control Unit

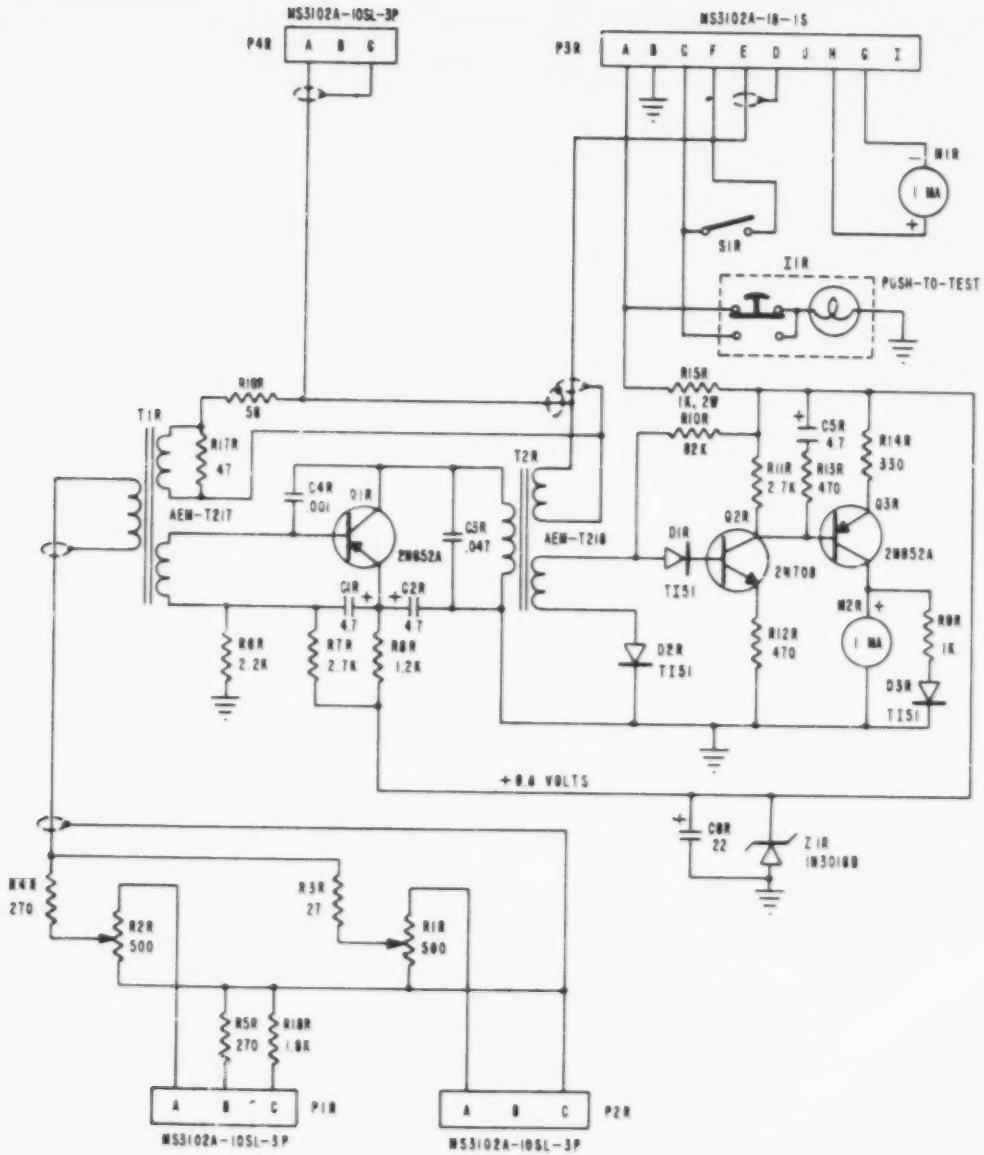


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Fig. 40 — Schematic Diagram, AEM-JB-1C Amplifier Rack Junction Box

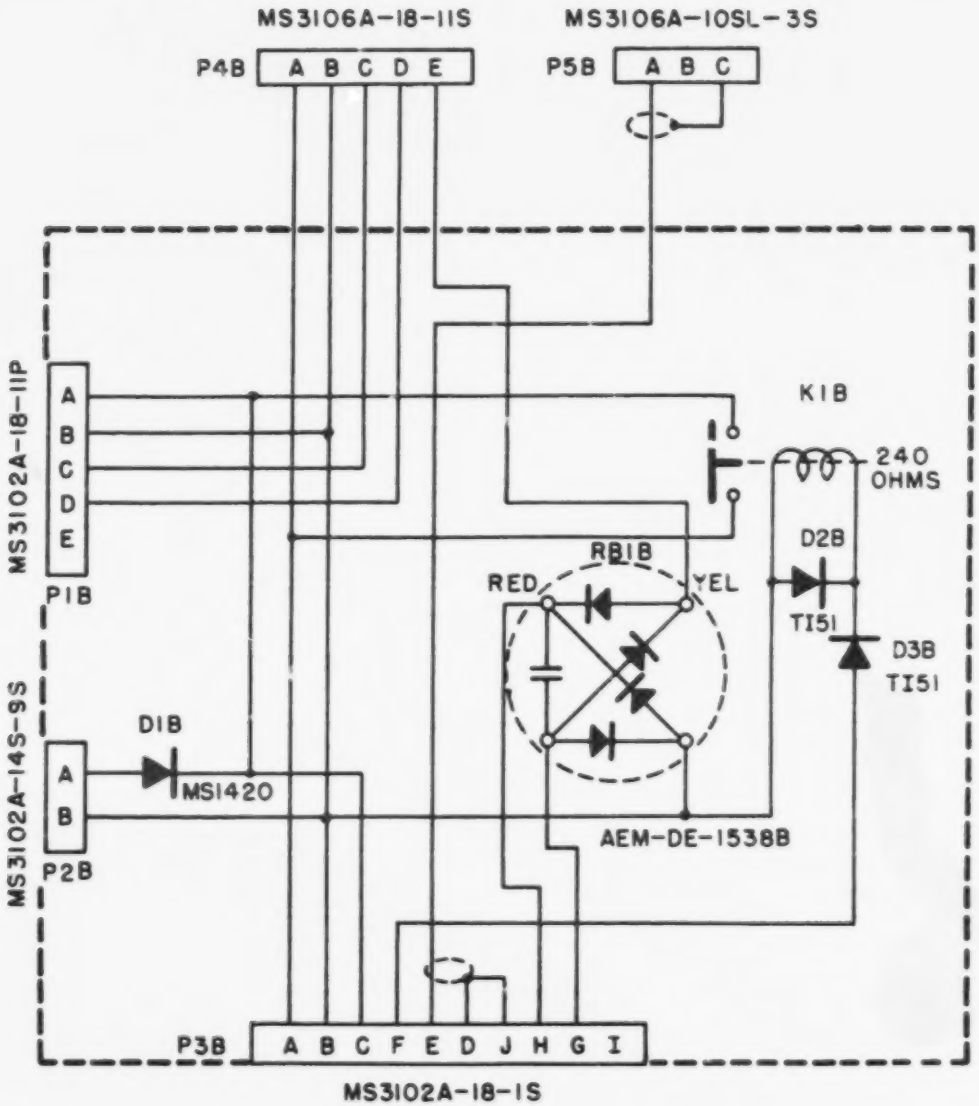


Fig. 41 — Schematic Diagram, AEM-H-92S-4 Speaker Unit

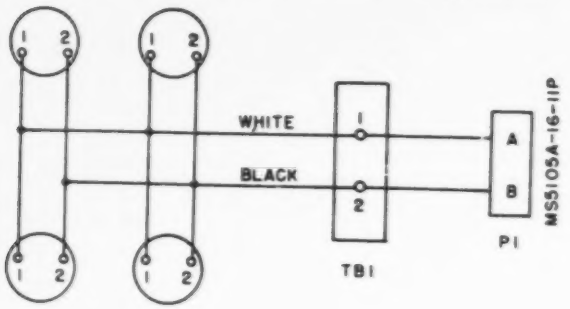
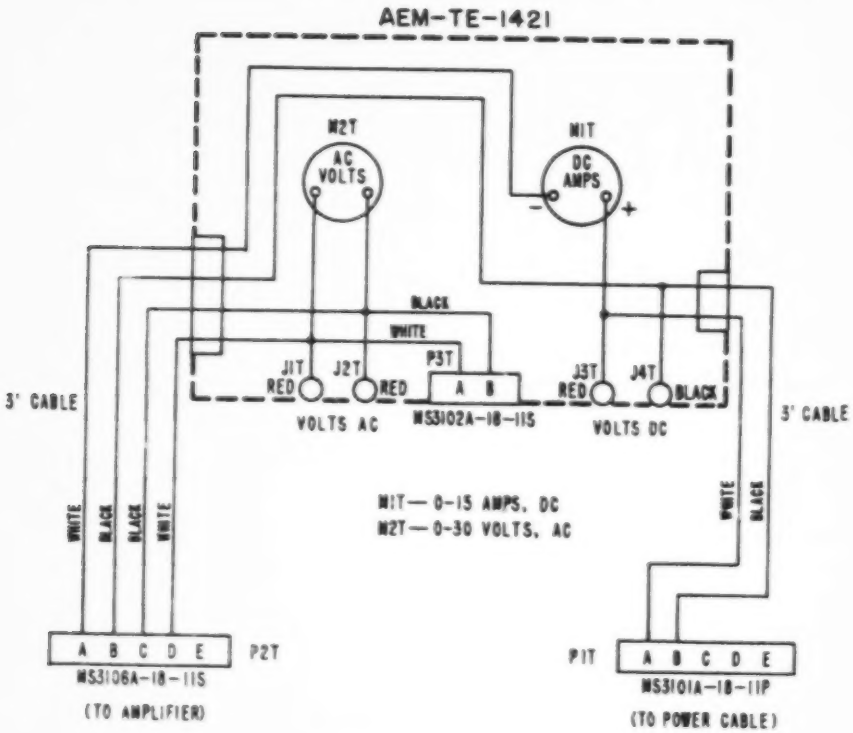


Fig. 42 — Schematic Diagram, AEM-FJ-1 Test Set



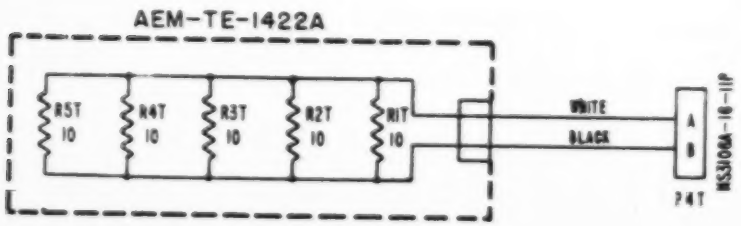
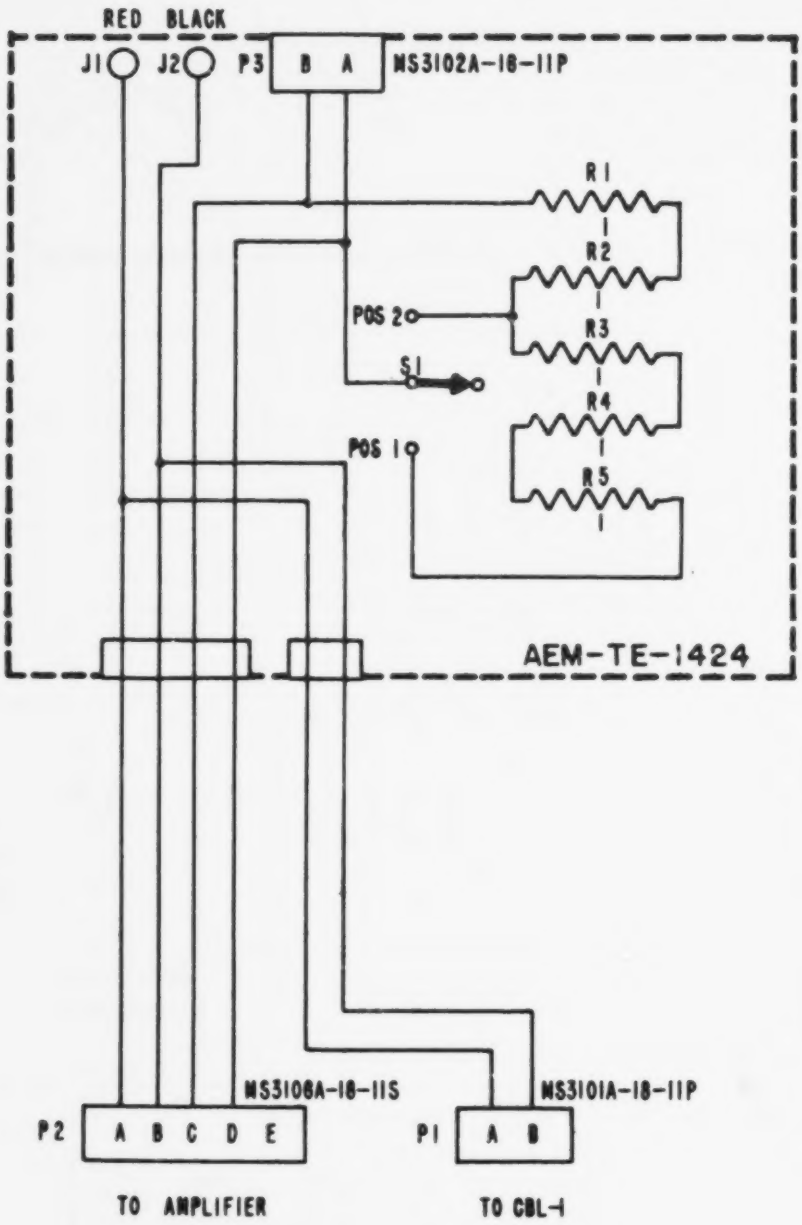


Fig. 43 — Schematic Diagram, AEM-TE-1424 Test Set



By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)
CNGB (1)
OCC-E (7)
CofT (1)
CofEngrs (1)
TSG (1)
CofSptS (1)
USACDCEA (1)
USACDCCBRA (1)
USACDCCEA (1)
USACDCCEA (Monmouth Ofc) (1)
USACDCOA (1)
USACDCOMA (1)
USACDCTA (1)
USACDCADA (1)
USACDCARMA (1)
USACDCAVNA (1)
USACDCARTYA (1)
USARCDCSWA (1)
USAMC (5)
USCONARC (5)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (3)
LOGCOMD (2)
USAECOM (7)
USAMICOM (4)
USASMC (2)
USASCC (4)
MDW (1)
Armies (2)
Corps (2)
USAC (3)
11th Air Aslt Div (3)
USATC AD (2)
USATC Arm (2)
USATC Engr (2)
USATC Inf (2)
USASTC (3)
Svc Colleges (2)
Br Svc Sch (2)
Army Dep (2) except
  LXAD (14)
  SAAD (30)
  TOAD (14)
  FTWOAD (10)
  LEAD (5)
  SHAD (3)
  NAAD (5)
  SVAD (5)
  CHAD (3)
  ATAD (4)
GENDEPS (2)
Sig Sec GENDEP (5)
Sig Dep (12)
Instl (2) except
  Fort Monmouth (63)
  Fort Hancock (4)
  Fort Gordon (5)
  Fort Huachuca (10)
  WSMR (5)
USA Tml Comd (1)
Army Tml (1) except
  Oakland (5)
POE (1)
Sig Fld Maint Shops (2)
WRAMC (1)
Army Pic Cen (2)
Chicago Proc Dist (1)
AMS (1)
USAERDAA (2)
USAERDAW (13)
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    11-97
    11-98
    11-117
    11-155
    11-157
    11-337
    11-500 AA-AE (4)
    11-557
    11-587
    11-592
    11-597
    31-105

NG: None.
USAR: None.
For explanation of abbreviations used, see AR 320–50.

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